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11
SESSIONAL PAPERS.

VOLUME XIV.—PART II.

THIRD SESSION OF THE FOURTH LEGISLATURE

OF THE

PROVINCE OF ONTARIO.

Session 1882.



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ANNUAL REPORT

OF THE

Commissioner of Agriculture and Arts

FOR THE

PROVINCE OF ONTARIO,

FOR THE YEAR

1881.

Printed by Order of the Legislative Assembly.



Toronto:

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1882.

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ANNUAL REPORT
OF THE
COMMISSIONER OF AGRICULTURE AND ARTS,
FOR THE
PROVINCE OF ONTARIO,
FOR THE YEAR 1881.

To His Honour JOHN BEVERLEY ROBINSON,

Lieutenant-Governor of the Province of Ontario, &c., &c.

MAY IT PLEASE YOUR HONOUR :

In taking a brief retrospect of the condition of the various Societies in connection with the Department of Agriculture during the past year, it is encouraging to be able to state that the improvement in business generally, manifest at the date of my last Report, has continued to advance, and that we may now reasonably hope that the severe depression, which so generally prevailed through several preceding years, has at length fully given way to an encouraging and prosperous state of things. The principal cause of this happy change is undoubtedly traceable to the late bountiful harvests, and the revival of the important lumbering interest, which had experienced a depression, both in intensity and duration, probably quite unparalleled in our industrial history. Commerce and manufactures have accordingly revived and extended, and all classes of the population may now be said to have full and remunerative employment. Prices for agricultural products have steadily advanced, the export of live stock has increased, and our Province and the Dominion generally have continued remarkably free from those destructive epidemic diseases which have been attended with the most disastrous results in several European countries.

It is therefore devoutly to be hoped that the manifest improvement in the general business of the country—the basis of which is its agriculture—will not be retarded by unwise or reckless speculations, and that all our various industries will be conducted on such principles the soundness of which has been demonstrated by the experience of the past, so that our present improved condition may not only be sustained, but continue to participate in the advantages which naturally attend all healthy and progressive development. It

cannot be too strongly impressed on the minds of the people that all real and enduring progress must be the result of *growth*, and consequently the feverish desire to become rich, apart from perseverance and intelligent industry, is certain to end disastrously both to individuals and communities.

The voluminous Report of the recent Commission on Agriculture has been in constant demand during the past year, and no doubt it will be much sought after for some time to come. The extent and accuracy of the information contained in these volumes, brought down to the present time, impart to them a unique character and value, and readily meet the wants of a numerous class of persons, both at home and abroad, who are desirous of obtaining reliable knowledge of the condition and prospects of our agriculture and its cognate industries. The large circulation of the Report, not only in Ontario and the Dominion of Canada, but also more or less in the United Kingdom and the Colonies, in the neighbouring Republic and several European States, cannot fail in awakening earnest attention to the state and prospects of this flourishing Province as a promising field for emigration, not only to the labouring classes, but also to enterprising people in general, possessing more or less capital.

AGRICULTURAL STATISTICS.

We see in the work of the numerous Societies established under the Agriculture and Arts Act what may be done by organized effort to aid and direct the industries of the country. Valuable information has been diffused, and a spirit of generous rivalry has been created and sustained. The reports and papers which make up the annual volume of this Department tell what skill and experience have been doing for the several interests to which they relate, and the Agricultural and Industrial Exhibitions held every year throughout the country give the opportunities for testing skill and experience by their fruits.

We owe much to those Societies : for progress made in cultivating the soil, the care and breeding of live stock, the extension of the dairy system, the use of labour-saving implements, and generally in manufactures and the useful arts.

But what progress are we making? How do the products of one year compare with those of another? These are very important questions, but we cannot answer them. We are in the condition of the man who carries on business without keeping accounts. This year's products may be greater or less than last year's; there may be an excess or a deficiency of supply; we have no means of knowing.

It is true that a census of the Dominion is taken once in ten years, but what do we learn from it that is reliable or practical as a rule for the conduct of business, or for showing our measure of growth and prosperity? If the information was published promptly it might serve some good purpose, once in a decade at least. But it usually takes a period of four to eight years to prepare the census of our industries, and by that time its usefulness is gone; the facts are of no greater interest to the country than any other facts in its history.

Besides, a census of industries taken once in ten years is a very uncertain indicator of the real progress and capabilities of the country; sufficient data are not afforded for

the calculation of averages. The census year may be in a period of inflation or of depression. It may be a fat year or a lean year. There may be a bountiful harvest or a scant one. There may be a "boom" in manufactures or a glut in the market for them.

In the last decade we saw the foreign trade of the country oscillate from \$217,304,516 in one year to \$151,832,863 in another. A census taken for either of those years would be wholly untrustworthy as evidence of our true condition.

The census of 1851 gave Ontario an average of 15.88 bushels per acre; that of 1861 gave an average of 17.76 bushels; and that of 1871 an average of only 10.42 bushels. Which of these, if any, is the correct average? or would an average struck from the three be the correct one? We must have the acreage and the product for a number of years in succession before we can answer.

Usually this Province has an annual surplus of several million bushels of wheat, but in one year of the last decade there was an estimated deficiency of more than two million bushels. Suppose the decennial census to have been taken in that year, what would the effect be? The fact would be published abroad; it would be seized upon by our rivals in the emigration fields of the old world, and it would bring conviction to tens of thousands of intending emigrants that ours was one of the worst of all countries for the farmer, the tradesman, or the capitalist, who wished to make his home and a living or a fortune in a foreign land. Until the next decennial census was taken our Province would continue to be marked and shunned, and even then the mischief might not be corrected. No dependence can be placed on the returns of an isolated year; to be reliable and of real value they must be as frequent as the harvests.

But there are other and even more important objects in collecting statistics of the agricultural and other industries of the Province. It is a good thing that we should ourselves know, and that we should be able to show to others, the rate of progress the country is making in wealth and population; it is a better thing that we should know the wants of each year and the extent to which they can be supplied. Will the products of the year suffice for the demand? Will there be a surplus or a deficit? Will prices rule high, low, or an average? A knowledge of such facts as these would be of great use alike to producers and consumers; it would tend to equalize prices and to distribute profits fairly; it would serve to foil the designs of the speculator in meats and breadstuffs, and give to the legitimate dealer a fair margin for business.

The Agricultural Commission was instructed to inquire into this subject of agricultural statistics and to report upon it, but they were unable to do more than refer to it and commend it to further consideration.

My own inquiries and reflections have led me to the conclusion that in the interests of the whole country it is most desirable that we should know our material position and progress from year to year. I am convinced that we should have an organized system for collecting and publishing facts and information relating to the agricultural and other interests of the country, and especially relating to the condition and prospects of the growing crops. A special report, dealing with Agricultural Statistics in these and other aspects, has been prepared at my request by Mr. Archibald Blue, and will be found in Appendix G. What has been done in other countries in the collection of statistics of

food supply, what is the practical value of such information, and through what agencies it may be most efficiently collected in this Province, form the subjects of Mr. Blue's report.

I hope to see the system matured and in operation during the present year. We cannot expect to find it run smoothly from the first, but, with the assistance of those whose interests it chiefly concerns, I look with confidence for a large measure of success.

AGRICULTURAL SOCIETIES.

These valuable organizations appear on the whole to have attained, at least, an average amount of success during the past year. A pretty accurate idea may be formed of their standing, and the work they have done within that period, by referring to the tabulated analyses of their returns as given in Appendix A. It is still a source of regret that so many Societies continue content with merely filling in the columns of the printed forms with which they are furnished, and otherwise giving little or no information relative to the actual state and prospects of agriculture and its allied industries within their respective operations. Having recently had their attention specially directed to these matters, there is ground for hoping that their next reports will be more instructive and complete. One fact, however, is quite certain, that the *quality* of live stock and other exhibits at the annual shows has been for several years gradually advancing, and comparatively few productions are now brought forward but what possess some positive merit. In this important respect these organizations have been doing for many years a good work for the country, since *quality* rather than mere quantity is the true measure of success. We have now but few agricultural shows that do not contain animals, grains and labour-saving machines, possessing more or less of positive merit, and some of which would occupy no inferior position in similar exhibitions of much older and wealthier countries.

I cannot refrain from again expressing a deep conviction that most of our Agricultural Societies would greatly increase their efficiency by their members coming together more frequently, as they might well do in winter, for mutual edification and encouragement. This would afford excellent opportunities for comparing notes; discussing local matters relating to the theory and practice of agriculture and horticulture; eliciting a spirit of inquiry, strengthening the invaluable habit of correct observation, and of promoting a good social feeling among the members. We have already in the Province a few Farmers' Clubs that are active and prosperous, and there can be no reason why the members of every Agricultural Society should not do in their respective spheres a similar work. We live in an age distinguished for co-operation and enterprise in most of the pursuits of life, and the tillers of the soil must fully awake to a proper sense of the importance and responsibilities of their noble calling, or be left behind in the general struggle for advancement.

Horticultural Societies, as separate organizations, appear to be neither increasing in number nor efficiency. Some of them act wisely in uniting with their respective County or Township Agricultural Societies for purposes of exhibition. The Goderich Society in particular may be mentioned as transmitting an annual report, replete with interesting and practical information of a very useful character. Most Agricultural Societies offer prizes for horticultural and mechanical productions, and it would be well if they could give more

encouragement in that direction, which could readily be done by inducing more people among those classes to become members. In a young country like ours it is desirable and advantageous to have all our most important industries well represented in the annual exhibitions.

AGRICULTURAL AND ARTS ASSOCIATION.

The report of this body (Appendix B) possesses a much larger amount of interesting and useful matter than usual, and will well repay a careful perusal. The Annual Exhibition, held at London in September last, was highly successful, as is always the case in that favourable section. The exhibits in all the more important departments were not only large, but, on the whole, indicated a very high order of excellence. The inspection of farms for premiums, that the Council have instituted for the past two years in the south-western parts of the Province, has been attended by an encouraging degree of success, and the Reports of the Judges will be read with much interest by our farmers generally, and by not a few beyond the limits of the Province. There is much valuable matter embodied in an interesting manner in these reports, conveying to the reader a pretty full and correct idea of the present state and practice of agriculture on some of our best managed farms. A similar investigation has been decided for the present year in a north-west section of the Province, which will doubtless be attended with equally satisfactory results. The prize essays on Forestry and on the Best Methods of Restoring the Impaired Fertility of Soils—a condition unfortunately too common in all our older settlements—will, no doubt, be read with absorbing interest, as they treat, in a lucid manner, questions of the most vital importance to the well-being of the country. The Council, at its last meeting, resolved on offering similar prizes for the present year, on Manures, and the Laying-out of the Farm Homestead, Garden and Orchard, with Ornamental Planting of the Surroundings.

A conviction has been growing for some time that the Provincial Association, in its present form, has seen its best days, and that the circumstances of the country have become so changed that its Annual Shows have been of late years more or less superseded by the great advance made by local exhibitions. This circumstance, in whatever degree it may be correct, is one rather for congratulation than otherwise, as it unmistakably demonstrates the great progress that has been made of late years in our Provincial agriculture and its allied industries. The fact that the old Provincial Association, established some thirty-five years ago, has done an invaluable work is readily admitted on all hands. It may be regarded as the parent of most, if not all, our agricultural organizations. But there has been for some time a growing feeling in the public mind that several important modifications have now become necessary in order to increase or even sustain its efficiency, and to adapt it to changed conditions and modern requirements. Its working management has become unwieldy and too expensive compared with the work performed.

With a view, therefore, of meeting the emergency, certain amendments in the Agriculture and Arts Act relating to the Association will be submitted to Parliament, during the present Session, for diminishing the expenses without impairing the efficiency of the Association. It is proposed that the Council should, as formerly, consist of thirteen members, representing thirteen Divisions of the Province, chosen as heretofore by the Electoral District

Agricultural Societies; all *ex-officio* members, except the Commissioner of Agriculture, to be dispensed with, and thus by greatly reducing the Council, the expenses of management will become proportionately diminished. It is also contemplated to relieve the Council from the necessity of holding an Annual Exhibition as heretofore, and to leave the subject of exhibitions to be dealt with as circumstances may arise and the wants of the Province require. A change of this nature seems to be called for on the ground of economy, and the great progress which of late years has been made by United Sectional Shows, performing in great measure the functions of the Provincial. It may probably be found, after further experience, that a grand Provincial Show, comprising a Dominion character and aims, held every few years, would meet popular opinion and become in every sense a success.

ONTARIO VETERINARY COLLEGE.

This popular institution continues to maintain a constant annual advance, both as to numbers and efficiency of teaching. Its students have excellent opportunities of gaining a knowledge of the theory and practice of their profession. The College possesses a valuable museum and library of reference, and a large and well-ventilated dissecting-room, furnished with the most approved appliances for carrying on those important investigations which may be said to form the basis of a thorough knowledge of the veterinary art and profession.

It will be seen, by referring to the Report, that this is no mere local school, as its name might seem to imply, for beside a large portion of its students coming from various parts of the Province of Ontario, there is always a considerable number from several of the other Provinces of the Dominion and various parts of the United States. At the conclusion of the collegiate year last spring the Honourable Adam Crooks, His Worship the Mayor, and other gentlemen presented a number of medals and prizes to the more successful candidates, and spoke in very encouraging words to the winners, with best wishes for the continued prosperity of the institution; and the indefatigable and popular President gave ample testimony to the diligence and good behaviour of both Canadian and American students. There still continues to be felt an increasing interest in the Veterinary Medical Society, whose members meet weekly during Term for reading and discussing original papers on the different branches of veterinary practice. These meetings in the past have been found to promote a good social feeling among the students, and to strengthen a desire for continued advancement in a knowledge of their profession.

FRUIT GROWERS' ASSOCIATION.

The proceedings of this Society, contained in Appendix C, will be found worthy of a careful perusal by such as feel an intelligent interest in several of the most attractive and important departments of rural industry. The number of members continues to increase, as also the attendance at the periodical meetings for the reading of papers and discussions on fruit culture, gardening and arboriculture, in which a more lively interest has of late been taken.

The *Canadian Horticulturist*, a well-conducted monthly, has been the means of eliciting a greater taste for the subjects which it seeks to promote; and it is in contem-

plation to enlarge its pages, as it now aims, in addition to fruit culture, to embrace a wider field so as to include general gardening and the principles of forestry, particularly the fascinating department of economic and ornamental planting. This useful serial, with a specimen or two of new or improved varieties of fruit trees, and a copy of the annual report, are regularly supplied gratuitously to the members.

It is satisfactory to find that mainly through the instrumentality of this Association the farmers of Ontario have of late years evinced an increasing interest in the cultivation of fruit of the more suitable and profitable kinds. As the old orchards wear out they are usually succeeded by new ones of selected kinds of fruit adapted to the soils, climate and markets of different sections of the Province. More attention is being paid to a proper selection of sites, draining and preliminary cultivation, and also to the vital question of subsequent management. Indeed, the raising of fruit in several sections of the south-western counties of the Province has already reached such a magnitude as to form no insignificant portion of public income. There appears no danger at present of overstocking the market at home or abroad, provided superior kinds are produced, and carefully gathered and packed. Our better class of apples are in increasing demand in British markets, and as the great North-West becomes settled the requirements for fruit will increase and become ultimately immense.

A large amount of practical information is contained in the report respecting the cultivation of fruit and the processes of drying, canning and exporting to market. It will also be seen that a Committee of Directors has taken much interest in assisting the Gardener of the Agricultural College in planting fruit and other trees and shrubs on the Experimental Farm, which cannot fail to be of service both to the pupils and the public.

ENTOMOLOGICAL SOCIETY.

The report of this Society (Appendix D) contains, like its predecessors, much useful and interesting information. There are several original papers, contributed by Provincial entomologists, of decided merit and well adapted to practical wants, clearly indicating that this interesting branch of natural science is making steady progress among us. The one by the President, on "Insects Injurious to Clover," is of special importance to farmers and seed dealers, and contains information almost entirely new to those numerous classes of the community. The Clover Seed Midge is a new and destructive pest, having already done serious mischief in several of the Northern States, and which unfortunately is already known in several places along the south-west border of Ontario. Those more immediately interested should carefully peruse the clearly written descriptions of this novel pest and the remedial suggestions.

The Society continues to sustain with unabated ability the *Canadian Entomologist*, a monthly periodical that is well known and appreciated by many cultivators of the science, both in Europe and America. It also possesses a valuable library of reference, and has obtained, during the past year, a first-class microscope, which will greatly serve to facilitate entomological investigations.

It is a cause of thankfulness that the Province has escaped any serious injury from insects during the past year. The Army Worm, which produced much mischief in some parts of

the Western States, it was feared might appear in Ontario, but in that respect we have been agreeably disappointed. It is to be hoped that the severe drought of last summer, in those parts where its ravages had been most destructive, would have the effect of depriving the newly-hatched larvae of the food necessary to their existence, and thus become the means of preventing the extension of the scourge during the present year.

With respect to the means and prospects of mitigating, if not absolutely preventing, the injuries and severe losses so frequently caused by certain kinds of insects, the President encouragingly observes in his admirable address :

“ Much attention has been paid, of late, by Entomologists to the natural conditions which favour or prevent the increase of injurious insects ; and I think there is good ground for expecting, after a few more years of close observation, that it will not be difficult to prognosticate, with a large measure of accuracy, several months in advance, the probabilities as to the insect pests likely to prevail during any year in any given district. When this can be satisfactorily accomplished much practical good may be expected to result therefrom ; since, by avoiding the planting of such crops as are likely to be especially injured by insect hosts, and growing others comparatively free for the time from these troubles, a large saving may be effected.”

DAIRYMEN'S ASSOCIATIONS.

From the Reports of the Eastern and Western branches of the Ontario Dairymen's Associations, published separately, it is satisfactory to observe that they continue to make steady and healthy progress. The annual meetings have been well attended, and an intelligent and zealous interest has pervaded all their proceedings. Several original papers were read and addresses given of no ordinary merit, and from which, and the discussions that followed, much useful and interesting information may be gleaned in regard to the science and practice of dairying.

The factory system of cheese manufacture in Ontario continues to advance. Although during the past year prices received a rather severe and unexpected check, the trade soon recovered, and became at least fairly remunerative. It is pleasing to find that creameries are surely, if somewhat tardily, increasing, both as to numbers, and what is of more importance, an improved quality of production, so that Ontario butter is beginning to find a better market, and advanced prices, both at home and abroad. There seems to be a unanimous opinion among those who best understand the subject, that in order to maintain and improve our position for dairy products, as also in live stock, we must be constantly striving to produce articles of superior merit.

I trust that when the Statistical branch of the Agricultural Department gets into operation we shall be able to procure definite and reliable information as regards the magnitude and worth of the dairy interest, with other important branches of our rural industry.

AGRICULTURAL COLLEGE AND EXPERIMENTAL FARM.

I have again the satisfaction of being able to congratulate your Honour and the friends of a higher Agricultural Education on the continued success of this important institution. From the Report (Appendix E), it is evident that during the past year a

large amount of valuable work was accomplished. In general efficiency, especially with reference to practical agriculture, it is not surpassed by any similar institution on this continent, while the cost of management is considerably below the average of colleges of this character.

It is necessary to refer to this Report only in very brief terms, as it contains full particulars of all matters of moment relative to the scope and working of the institution. The able and accomplished President, in the first part of the Report, gives very fully and lucidly a large amount of interesting information on the number and condition of the various classes, the subjects taught, the relative standing of the pupils in both years, domestic management, and, in short, whatever relates to what may be termed indoor work. From these statements it is evident that both teachers and scholars have found very full and constant employment. The Report of the Professor of Chemistry on Cattle-feeding, the composition and value of different foods and fertilizers, will amply repay the study of intelligent and enterprising farmers, and clearly indicates both the willingness and ability of the experimenter for entering, with an encouraging sign of success, the wide and interesting field of original research.

The latter portion of the Report will be perused with a deep interest by practical farmers. The indefatigable Professor of Agriculture and Farm Manager, shews at least no diminution of his wonted energy in experimenting with cereals and live stock, and, however individuals may in a few instances differ from Professor Brown's opinions, or apparent conclusions, all will readily admit that he is pursuing in right earnest the investigation of certain subjects which very much need a closer scrutiny and exact experiment than they have commonly received, and which are of the utmost importance to the improvement of Canadian agriculture and the well-being of the whole farming community.

Increased attention is now being paid by this college to Horticulture in all its branches, including Forestry, the laying-out of grounds with economic and ornamental planting. The Gardener is assisted in working out these objects by a committee of a few directors of The Fruit Growers' Association, and a very encouraging commencement has been made already. In a few years the college and farm buildings, with their surroundings, will become greatly improved in picturesque appearance, which, with practical instruction in these branches, will elicit a correct taste in the pupils, and impart a capability for gratifying a natural desire afterwards of applying the knowledge and taste acquired at college to the improvement of their own homesteads, and thus be the means of increasing the beauty and attractions of rural life.

POULTRY ASSOCIATION.

From the Report of this Society (Appendix F) it will be found that Ontario is making constant advancement in the breeding, fattening and management of poultry; a result to which we are mainly indebted to the Poultry Societies that, of late years, have been brought into existence. By means of these agencies a most striking improvement has been made of late years in the breeding, and preparing for market, the various classes of poultry, and much trustworthy information has been obtained as to the best and most

profitable varieties adapted to our climate and markets. Within a comparatively few years a wonderful change has been effected for the better in these respects, and by zealously and intelligently following up the subject, there is, doubtless, awaiting us a bright and encouraging future.

The Annual Exhibition, held at Brantford, may be regarded on the whole as decidedly successful; and as reliable statistics are obtained on this subject it will be found that the poultry interests of Ontario are of a much greater magnitude and importance than is generally imagined.

Respectfully submitted.

S. C. WOOD,
Commissioner of Agriculture.

TORONTO, January, 1882.

APPENDIX TO REPORT

OF THE

Commissioner of Agriculture and Arts.

APPENDIX (A).

ANALYSIS OF REPORTS OF AGRICULTURAL AND HORTICULTURAL
SOCIETIES FOR 1881.

ANALYSIS OF REPORTS

OF

Agricultural and Horticultural Societies

FOR THE YEAR 1881.*

BRANT, NORTH.

The Annual Fall Exhibition was held on the 5th and 6th days of October, and, taken on the whole, was a great success.

The number of entries in horses was about the same as last year, and the same may be said in regard to cattle, sheep, pigs and poultry, but the quality was considered much better in all the classes.

There was a fine display of carriages and implements, Messrs. J. Lloyd & Sons and Mr. D. Maxwell being large exhibitors.

The Hall was much better filled than last year. The show of fruits, roots and vegetables was said by many to compare well with the Provincial Fair. There was also a fine display of plants and flowers.

The dairy department was fully up to former years; and the grain show contained some fine samples.

The display of ladies' work was very large and attractive, and was much admired by the numerous visitors on both days of the Exhibition.

The receipts at the Fall Exhibition amounted to \$326.93, being \$60.73 less than those of 1879. This decrease was owing, no doubt, to the unfavourable state of the weather on the second day of the Exhibition.

The entries of stock and produce may be enumerated thus, viz.:—Horses, 218; cattle, 108; sheep, 150; pigs, 60; poultry, 205; grain, 47; dairy, 69; roots and vegetables, 259; plants and flowers, 131; fruits, 425; carriages and implements, 57; ladies' department, 230; mechanical work, 21; extras, 56; in all 2,036 entries, being 368 more than those of the preceding year.

As the agricultural grounds are just leased from year to year, and they are rather small, we consider it would be well if steps were taken to procure a more suitable piece of ground. And your Directors would strongly urge that some expression of opinion should be elicited at the Annual Meeting with regard to the question of securing a suitable site for the erection of buildings at as early a date as possible.

Onondaga.

Your Directors would most respectfully submit the following report of the proceedings of our Association for the year just closed, and would state that there is nothing

*The names of Electoral District Societies are alphabetically arranged and printed in capitals, with their respective Townships and Horticultural Societies in italics. Condensed financial statements will be found in tabulated form at the end of this Appendix.

special to report as to the position of our Association, as its affairs generally remain as they have been from year to year heretofore. The entries and exhibits compare favourably with those of previous years—certainly not behind in any class. The amount paid in prizes for the past year is somewhat in excess of previous years, as will appear in our financial statement. This is owing to slight additions having been made to several classes in our prize list. We have been enabled to make these extensions of our list through the contributions made to our Society by Messrs. Robert H. Snider, Shirra and Howard, William Salt, William Burrill, sen., and others, who have thus kindly given encouragement to our small but now venerable Association.

The number of members for the past year falls below the preceding one somewhat, as also the receipts for admission to the Hall.

We present herewith our financial statement, which shows that we have still a small balance on hand, and that we are not hampered by any debt whatever.

DUNDAS.

The Directors of the Agricultural Society of the Electoral Division of the County of Dundas, in presenting their Report, beg leave to congratulate the Society on the favourable state of the finances, there being a balance in the Treasurer's hands of \$54.71.

They find an increasing interest taken in the Society, as evinced by the increasing membership, the membership of 1880 having increased by forty members; and they feel every confidence that by proper energy and zeal this increase can be doubled this year, and this Society made one of the most flourishing in Eastern Ontario.

In obedience to the resolution passed at the last Annual Meeting, the Directors held a conference with the Township Societies with a view of amalgamating these Societies with the County Society for the purpose of holding an exhibition in the county, but no satisfactory arrangement could be made.

Mountain.

The Directors of this Society, in presenting their Report, beg leave to state that the crops of 1880 have not been as heavy as in some former years. The fall wheat in general was badly winter-killed. Still the grain is of first-rate quality. The spring wheat was nearly a failure. Barley and oats are an average crop and of first quality, except some being coloured by rain. Hay, in some sections, quite light, while in others heavy; upon the whole an average crop.

The Directors think that there is a lack of interest taken in the Society by many of the leading farmers and mechanics of this township, consequently the Society is not as strong as it otherwise should be.

The morning of the Annual Exhibition was very wet, consequently there was not as many cattle and sheep as would have been had the weather been fine. There was a large show of horses, competition in nearly every section being sharp; a marked improvement was visible.

The grain exhibited was of first quality. The roots and hoed crops were in abundance, and of quality that surpassed any previous exhibition. Butter fairly represented, and of good quality. Cheese scarce, none being made except factory. The ladies' department was well represented; in several sections competition very keen. Upon the whole, the Directors are satisfied that if the day of exhibition had been fine the show would have been a success.

DURHAM, WEST.

Your Directors have nothing special to report as to the operations of the past year. The usual routine has been pursued, with something more than the usual success. A Spring and Fall Exhibition was held as in former years, both of which were of superior excellence. The state of the weather on the day of the former proved most unfavourable.

which largely affected the receipts at the gate. The Society is unfortunate, too, in having its Fall Show so late in the season, coming, as it does, after nearly all the other Agricultural Exhibitions in this vicinity, and this year on the same day as the Exhibition of the adjoining Society of North Ontario, which militated somewhat against our own. Still the Show compared favourably in every respect with any that had preceded it. The attendance was large. The animals and articles entered for exhibition were generally of superior merit, and exceeded by 240 the number of entries at any former exhibition of the Society, reaching the large number of 2,241. The amount paid in prizes also exceeded by \$105 the amount paid in any former year.

It will be seen that the balance in the hands of the Treasurer is considerably less than at the last Annual Meeting, for the reasons, in addition to those already given, that \$45 has been paid to the Newcastle Horticultural Society, being the first payment made to that Society, and \$40 in excess of last year to the Central Exhibition.

Your Directors are glad to know that the union of the two Societies continues to work to entire satisfaction, and they recommend its continuance.

Your Directors submit herewith the Treasurer's statement of receipts and disbursements, as certified by the Auditors, a classified statement of prizes paid, and a list of members of the Society, as required by the Statute.

Clarke.

The Directors, in submitting their Annual Report for the year 1880, have pleasure in stating that Township Shows are growing more and more in favour with the general public, and the competition in every department is more keen and spirited within the last two or three years than ever it was previously. The last Fall Show held at Newcastle upon the first and second days of October testifies to the increasing interest which your Directors have at all times endeavoured to stimulate by a revision of the premium lists, extending the Prize List in such departments wherein a growing interest is being taken; the experience gained in the Annual Exhibitions gives opportunity for taking advantage, utilizing and suggesting wherein defects are found, complaint made, remedying such in the future.

Your Directors herewith submit a brief abstract of the number of entries and prizes offered under the several classes:—1st Class A—horses—exclusive of the Spring Show, 82 entries were made, and \$134.50 premiums offered. Class B—cattle—45 entries, \$47. Class C—sheep—38 entries, \$48. Class D—swine—28 entries, \$42. Class E—poultry—83 entries, \$14.50. Class F—grain and seeds—92 entries, \$25.25. Class G—fruit—200 entries, \$17.25. Class H—flowers and plants—90 entries, \$15. Class I—vegetables—177 entries, \$20.25. Class J—dairy produce—105 entries, \$26.75. Class K—agricultural implements—29 entries, \$72.50. Classes L and N—manufactures and domestics—144 entries, \$93.50. Class M—ladies' department—267 entries, \$66.50. Root crops, in the field—17 entries, \$21.

Your Directors held a Spring Show in Orono in the month of April last, at which there was a good attendance. The horses and cattle exhibited would compare favourably with past years.

They dispensed with a ploughing match in the fall, the funds on hand not being sufficient to warrant the holding of one.

The usual annual grants have been paid over to the Municipalities of Clarke and Newcastle. There is a slight decrease in the membership this year from last.

The report of the Auditors will be laid before you, also a detailed statement of the receipts and disbursements during the year, showing the balance in the Treasurer's hands up to the close of the current year, amounting to \$150.53.

The amount paid out in prizes for the Fall and Spring Shows was \$544.25.

Your Directors, considering the changes taking place throughout the Province in respect to the export of cattle, sheep and poultry, deem it advisable to draw the attention of the members of the Society to the propriety of increasing the premiums in the aforesaid classes. They are of opinion that the premiums given for agricultural implements could be in a great measure dispensed with.

ESSEX, NORTH.

The Directors of the Society for the year just closed beg to submit to the members the following Report :—

As you are all aware, the Annual Exhibition was held at the Village of Woodslee on the 12th and 13th days of October last, and was favoured with good weather, and your Directors are happy to be able to state that the show was a great success.

In nearly all the departments, both in quantity and quality, it proved to be the best the Society ever held, the total number of entries being 1,058, showing an increase of 71 over the entries in 1879.

The receipts for admission, the two days, amounted to \$200, at 15 cents per ticket, exclusive of members' tickets.

The exhibits in nearly every department of the show were greater in number than ever before, while the worth and appearance betokened marked advancement.

In the live stock display, the improvement over former shows was perhaps the most apparent in the horse classes, particularly in the division assigned to draught animals.

The Clydesdale are certainly attaining to much greater popularity than formerly, and the entries of pure and cross-breeds were very fine.

Your Directors are of opinion that stock raising is destined to become one of the principal branches of the agricultural profession in this Province, and to compete with other counties, and win her share of the profits of the business, Essex must pay more attention to the necessity of a wise selection of male animals.

The market in all such cases should be the farmer's guide ; and he should have recourse to such breeds as will enable him to meet the demand.

For exportation to Europe and to the great prairie regions of the North-West, the market promises to be good and durable for large, active, stylish horses ; and with a knowledge of this fact our people should adopt such a line of action as will enable them to draw buyers to this country. The number of entries in horses was 117, showing an increase of 15 over that of 1879.

In respect to horned cattle, about the same remarks will apply to the last Fall's Show as well as to the interest of the farmers. Not only do we want to bring up our herds to our own ideal standard, but if we consider our financial good, to the standard of those who have established an immense trade in beef-cattle with the mother country and other European continental nations.

Great size, aptitude to lay on flesh, and early maturity are the requisites in cattle for exportation ; and the testimony of the best breeders in all civilized countries is, that these qualities are the most readily attained by resorting to the pure Durham or Short-horn variety, while the nearer to purity of blood, the greater the profit of production.

Therefore, it is exceedingly gratifying to your Directors to report that at the last Exhibition the display of Durhams and high grades was surprisingly good and the competition in some cases very close.

In this also we would strongly urge farmers to fully waken to their interests, and take good care to merit a share of the benefit resulting to Ontario from the exportation of cattle. The number of entries in cattle was 106, showing an increase of 31 over that of 1879.

Sheep husbandry, perhaps, is second to no other to the enterprising Canadian farmer of to-day, and those sections of our fine country most noted for prosperity make the raising of thoroughbred stock lucrative.

In this county improvement has gone on slowly in this department ; unusual pains have been taken to introduce pure-blooded stock animals of great merit, by means of which our flocks may in the space of a few years be immensely improved.

Such of our members as have shown spirit enough to move more rapidly than their neighbours in this respect are to be commended, and ought to have every encouragement extended to them. The number of entries in sheep was 78, showing an increase of 21 over the entries in 1879.

We have to report a decided improvement in the display of swine ; also the exhibits having been almost wholly drawn from the middle or small breeds, now generally ac-

knowledgeed to be the most profitable of that class of stock. The number of entries in swine was 41, showing a falling off of 25 from the number of entries in 1879.

In the poultry class the entries were few in number, but fairly good. The number of entries was 33, showing a decrease of 26 from the number entered in 1879.

The display of seeds and roots was very good, in view of the season, which was unfavourable for some products. The number of entries in seeds and grain was 131, which shows a falling off of four from the number in 1879; and the number of entries in roots was 90, against 98 in 1879.

The fruit show, we may say, was almost wholly confined to apples, the exception being a few lots of peaches, grapes and quinces. The number of entries in fruit was 68, or two over that of 1879.

In the dairy product classes, as usual, the competition was nearly all between Messrs. Plant and Arnald, both showing a high quality of cheese. The gentlemen waived any claim to the art of butter-making, and duly honoured the ladies' claim; and the best prizes were carried off by Mrs. Mary A. Taylor, Mrs. George Leek, Mrs. S. S. Ackley and Mrs. Fred. Moon. Miss Agnes Plant was again successful in carrying off the first prize for bread. The total number of entries in dairy products and provisions was 92, showing an increase of 42 over that of 1879.

As usual, the carriage manufacturers made a grand display, the entries being numerous and embracing almost every kind of vehicle in use in this country. The number of entries in this class was 77, showing a decrease in number of 48 since 1879.

In the wool and leather department the entries were small in number, but the quality of goods shown was well worthy of special mention. The number of entries in that class was 46, or five in excess of 1879.

In the ladies' work department, perhaps there was the keenest competition of the show, and certainly the display was admirable, embracing works wrought with great patience and skill, showing at least that this part of the exhibition will be very interesting in the future shows of our Society. The number of entries in this department was 179, or 66 over that of 1879.

Your Directors have few recommendations to present before you. They would strongly urge upon all the sinking of everything like local feeling or sectional jealousy, and the promotion, instead thereof, of a strong and determined feeling to improve the Society, as the very best means of improving the condition of the farming community of North Essex. Good-natured rivalry is praiseworthy, and the guiding notion of all exhibitions should be to beat all competitors by producing stock and other exhibits of a higher order than others possess; and when defeat ensues instead of success in the contest, the circumstances should be unattended by bitterness, and only provoke a determination to try harder to win at the next exhibition.

There seems to be a growing feeling on the part of live stock exhibitors, that the Society should provide shelter pens for all classes of animals embraced in the prize list. This will doubtless be matter for the serious consideration of our successors in office.

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Rochester and Maidstone.

Your Directors again have to report a falling off in the number of members, as will be seen from the list of names of members, with the amount paid by each, hereto annexed.

The North Riding Fair was again held at Woodslee last fall, therefore no Township Fair was held, but your Directors incurred considerable expense in providing accommodation for the Electoral Division Fair, which will be more than provided for from the funds received from booths and stands.

The stock animals at present kept for the Society consist of a Durham bull kept by John Brookes—its term expires in October next; a Durham bull kept by William McCloskey, and one kept by Matthew Brome, which are to be kept till October, 1882; and boars kept by John Brookes, Michael Fitzgerald, and Miles Doran, none of which will require to be replaced before the end of the present year.

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Maidstone and Sandwich.

In meeting you at the close of another year, your Directors desire to congratulate you upon the improved financial condition of the Society. At the Annual Meeting last year there was a balance on hand of \$198.82, and now that amount is nearly doubled and our financial report shows a balance in hand of \$372.60.

Your Directors have now five bulls on hand, and their time will not expire till the 7th day of March, 1882. Your Directors have also on hand three boars, whose term will end on the 1st day of March next, and it will be necessary then or before that time to purchase a fresh supply.

Your Directors also desire to congratulate you upon the increased number of members in the Society, it having increased eleven members in 1880 over the number in 1879.

Your Directors wish to urge upon the members the necessity of paying their subscriptions early in the year, so that the Society can get the Government grant on it. Some hold back their subscription every year until after the Report is sent to the Treasurer of the North Riding Society, thereby depriving the Society of the Government grant. We hope this will not happen again.

In conclusion, your Directors congratulate you on the general prosperity of our Townships and the country at large; it is certainly evidence of prosperity to see so many beautiful and costly buildings continually rising up in our midst. It is true the very wet summer had a bad effect on some kinds of crops the past year; but although it rendered them somewhat short in quantity, prices of all kinds of produce were satisfactory, and we have great cause for thankfulness. While some in less favoured countries are suffering deprivation and even famine through the failure of their crops, we are blessed with a sufficiency for man and beast.

Tilbury, West.

This Society would appear, from the statements made at the Annual Meeting, to be doing a good work. The number of members has slightly declined, and regret is expressed that the farmers of the Township do not render that amount of support which the importance of the objects sought to be obtained require. The Exhibition, however, was moderately successful. Three acres of land have been purchased for exhibition purposes and a hall erected. A Ploughing Match was held, seven teams competing, but the attendance was small in consequence of unfavourable weather. Improvement in the important operation of ploughing is evidently increasing. Total number of entries for the show last year was 546, against 417 in 1879.

ESSEX, SOUTH.

The Annual Exhibition of the Society was held at Leamington on the 5th and 6th days of October last. The show was in many respects a decided improvement upon the one held in the same place three years previous, thus showing that the prejudice that formerly existed against the South Riding Society is abating.

The total number of entries was 1,156, being a slight decrease on those made in 1879. There was a good show of stock, especially in horses. The show of seeds, grain, roots, and fruit was exceedingly good. In dairy and home manufactures the show was deficient, while in ladies' work it was excellent. Upon the whole, the Directors should pride themselves upon the success of the Exhibition of 1880.

It is to be regretted that the South Riding Society is not better supported than it is. With a membership less in number than many Township Societies (many of which do not pay in their subscriptions in time to enable the Treasurer to make his return to the Agricultural Department) great things cannot be expected from it.

While the Directors use all the means in their power to make the shows successful, it is not too much to expect more help and co-operation from the community at large.

Some parties make objections against the holding of Township Fairs—that the money expended thereat could be expended more advantageously, and that if there were fewer

Township Fairs the County Fairs would be better supported. Others, again, are of the opinion that Township Societies, such as now exist, have served their day, and could now be dispensed with without detriment to the interests of agriculture.

These are questions that should engage our careful consideration. That Township Societies have been beneficial in the past cannot be disputed; great improvements have been made in the stock of the County by the pure-bred stock introduced through the agency of Agricultural Societies. But the question naturally arises: Has not the introduction of stock in this way been injurious to individual enterprise? The County is becoming well settled and cleared up, and the necessity for Legislative aid is not now so great as when it was sparsely settled and the people comparatively poor. The farmers are now becoming well off; they erect costly dwelling-houses; they build large and commodious barns and stables; they make improvements on their farms in draining, manuring, and fencing; they use the more recent contrivances introduced for conducting their farming operations; they do not need Legislative aid to enable them to carry on any enterprise which they choose to undertake. Then, we ask, why should they not take the same means in improving *their* stock as they do in conducting their other operations, without depending upon the small pittance received out of the Government purse? * * *

In conclusion, we have great reason to rejoice and be thankful for the abundant harvests of the past three years. Better times have appeared, trade has revived, money has become plentiful, and all classes are prospering; for which let us open our hearts in praise to our Creator, the great Author of all our blessings, and pray that His mercies may be continued to us in the future as they have been bestowed upon us in the past.

Colchester.

The Officers and Directors of the Colchester Agricultural Society beg leave to report to the Annual Meeting of the said Society, held this 13th day of January, 1881—

That the whole number of members on the Treasurer's book shows 188 members; forty-seven of those joined on the day of the Fair. One hundred and eleven got the *Farmer's Advocate* by paying \$1.25 each.

That the number of members who paid their subscription in time to be returned to the County Treasurer has been ninety-five, and that the amount of their subscription amounts to the sum of \$122; and that the sum of \$81.26 has been received from the Treasurer of the South Essex Agricultural Society as our Government apportionment.

That the whole amount of receipts was \$439.05 for the sale of stock, Government grant, etc., as shown by an abstract of the Treasurer's account hereunto appended.

And that the payments made by the Society during the year for the purpose of paying the expenses of the Society, and in payment of stock purchased by the Society, as shown by the said abstract, has amounted to the sum of \$241.24, leaving a balance of \$197.81 in hand of the Treasurer.

It is also shown by the said abstract that our liabilities amount to the sum of \$497.03, and that our assets amount to the sum of \$209.45, leaving our liabilities over assets amounting to the sum of \$287.58.

GRENVILLE, SOUTH.

The Twenty-second Annual Exhibition was held on the grounds of the Society at Prescott on Wednesday, Thursday, and Friday, September 1st, 2nd, and 3rd.

From a financial point of view the Exhibition was not so successful as was anticipated, mainly, if not altogether, on account of the oppressive heat during the three days. Notwithstanding this great drawback, the receipts at the gate exceeded those for several years previous. A large amount of money was expended on the grounds and buildings during the past year. The fitting up of the refreshment rooms under the grand stand cost a considerable sum of money, which of course was paid out of the receipts of the exhibition. Your Directors consider this money well expended, as these apartments are now permanent and will hereafter be a source of revenue to the Society.

The number of entries, as shown by the Secretary's books, was in excess of those received for many years previous.

An unusually large number of horses were exhibited, comprising many beautiful animals. It is gratifying to notice the wonderful improvement in this department during the past few years. The number of cattle on exhibition was also very large, and, as stated in regard to the horses, a marked improvement in the animals was noticeable. The sheep and hog pens were well filled with fine specimens in each class. The display of poultry was the largest and best ever seen in the County. In the department of agricultural implements there was a fine display, comprising many useful and valuable machines. In grain and seeds the number of exhibits was simply immense. The excellence of the samples in this class caused the Judges much trouble and labour in making their awards. The department of roots and field crops was unusually well filled. Notwithstanding the early date on which the Exhibition was held, the display of garden vegetables and horticultural productions generally could not be excelled. The dairy department was well represented, and the samples on exhibition were of the choicest quality. Quite a number of samples of leather were exhibited, which were a credit to the manufacturers. The Floral Hall was literally packed with exhibits of various kinds. Much credit is due to the ladies and gentlemen who assisted in decorating the hall. Mrs. Benjamin French, under whose direction the hall has been decorated for many years, was again conspicuous last year. Your Directors wish to make special mention of the very fine displays made by several of the merchants of Prescott, and hope this department may in the future be patronized more extensively than heretofore.

Your Directors take this opportunity of thanking Mr. J. P. Wiser, M.P., for his very liberal donation in the form of special prizes.

There is no doubting the fact that these annual exhibitions are a source of great benefit to the farming community. Every improvement that can be made to facilitate and lighten farmers' labour and forward the farming interests is a blessing to our whole country. It is to be hoped that every farmer in South Grenville will exert himself to make the Exhibition of 1881 surpass all previous ones.

Edwardsburgh.

Your Directors, in presenting their Annual Report, take pleasure in stating that the finances of the Society are in a favourable position. The Treasurer's report, which will be laid before you, shows a balance to the credit of the Society of \$73.37, and the amount taken at the gate during the days of the show from non-members being in excess of former years, shows that the interest taken by the general public in the Edwardsburgh Fair is steadily increasing, which is very encouraging.

The display of horses was very fine indeed, most of the animals appearing in prime condition. In the cattle line the same can scarcely be said; there is certainly great room for improvement, especially in the class of bulls, which were rather inferior. The show of sheep and pigs was fair; in sheep there was a slight improvement. The show of poultry exceeded that of former years, most of the different breeds being represented. Part of the cereal crops were of good quality, especially fall wheat and oats; spring wheat was rather inferior, and barley scarcely up to the mark. Roots and other hoed crops were not as large as usual, owing to the great drought of summer; there were a great many entries of potatoes, mostly of large growth, taking the season into account. In dairy products there was a slight falling off, but the packages exhibited were pronounced by the Judges to be excellent in quality. In fruit the display was very creditable for this section of the country. In the ladies' work and domestic manufactures the articles exhibited were not so numerous as at the show of 1879, but there was a decided improvement in those exhibited, showing better taste in selecting and producing those that were on exhibition. In mechanics' work there was a very creditable display of carriages, which reflected considerable taste on the manufacturers.

GREY, NORTH.

The Directors for the year 1880 report as follows:—

Immediately after the close of the Annual Meeting of the Society a Board meeting was held for the purpose of organization and the consideration of the question whether or

not a seed fair or spring show should be held. Owing to the fact that the Society was then not only without funds, but in some debt, it was decided that a seed fair should be held, but without the offer of any prizes, and that there should be no spring show. Within a few days, however, subscriptions were taken up to enable the awarding of prizes at both a seed fair and a spring show, and at a meeting of the Directors held on the 11th of February it was resolved to depart from the conclusion reached on the 21st of January, and to hold both shows, as had been done the year before. This change was carried out, and a seed fair was held on the 5th of March and a spring show on the 23rd of April. The entries at the former were twenty-one, as against twenty-four in 1879; at the latter twelve, as against fifteen. Nine subsequent meetings of the Board were held relative to business connected with the Society, namely, on the 5th of March, the 3rd of April, the 23rd of April, the 19th of June, the 26th of June, the 28th of August, the 5th of October, the 6th of November, and the 15th of December. At the meeting of the 3rd of April the question of continuing to hold a Union Show came up and was decided in the negative, and consequently the Fall Show was held independently of any other Society. In the early part of the year the Directors found it necessary to borrow funds in order to pay off current liabilities, the treasury having become depleted, and they obtained a loan for a short period from the Merchants' Bank, which loan the Treasurer repaid out of the first available moneys. Owing to the funds of the Society having become entirely exhausted, and to the necessity which existed for making an effort to place it on a financially better footing, some of the Directors took upon themselves the work of canvassing for subscriptions and of soliciting the accession and support of new members, and in this connection Mr. William Thomson is especially entitled to notice and commendation. Through his exertions a large addition to the membership roll was obtained, and a fresh interest on behalf of the Society was created in many quarters.

But the Directors not only found it needful to resort to measures for procuring funds to place the Society in a more creditable position, they judged it also to be expedient to cut down the prize list very materially both in the amount of premiums to be offered and in a revision of the list of articles to be exhibited. These measures, coupled with judicious economy in the expenditure of money for the miscellaneous purposes of the Society, have been so far effective as to enable the presenting to-day of a balance sheet showing that there is in the Treasurer's hands the sum of \$223.94, after payment of nearly all claims against the Society.

A number of friends of the Society gave handsome donations to its finances, and among the contributors appears the Town of Owen Sound for \$50. In the early part of the year the Town of Meaford put forward an offer of a similar sum on behalf of the Corporation of Meaford, provided the Fall Show was held there, but a majority of the Board did not think it expedient to go to Meaford last fall.

In 1879 the members of the Society numbered 118, in 1880 this number was increased to 202. Of these 123 were exhibitors at the Fall Show, and eighty-nine were prize takers. The whole number of exhibitors at all the shows of the Society for the year 1880 was 138, of whom ninety-seven obtained prizes.

In 1880, as compared with 1879, there was an increase in the entries of one class only, namely, roots and hoed crops—135 in 1879, 150 in 1880. The decrease in the other classes was as follows:—Horses, 4; cattle, 62; sheep, 54; swine, 41; poultry, 4; grain and seed, 34; vegetables, 189; dairy produce, 7; fruit, 242; manufactures, 18; ladies' work, 34; plants and flowers, 172 (there being none of the last in 1880); special, 15: making the increase in one class fifteen, and the decrease in all the others 846—the total entries in 1879 having been 1,785, and in 1880, 924.

The Directors desire to submit for the consideration of the members in the immediate future whether it has become desirable that better accommodation shall be provided for the exhibitions of the Society both outside and inside, and, if that be admitted, whether it will not be prudent to take measures to procure a suitable site. Should the Society make the progress which it is reasonable to anticipate it may make, it will not be a great while before this question must receive attention. * * *

GREY, EAST.

Your Directors, in presenting their Annual Report, regret their inability to report the Fall Exhibition a great success. The very unfavourable weather which visited us during the time the Exhibition was held prevented members from bringing their stock and articles of manufacture for exhibition. The same cause prevented members and others from putting in an appearance, consequently the receipts at the gate were less than on former like occasions. There is also a slight decrease in membership, owing to the fact that the members did not all compete, and as there was no dollar to retain their membership, has ceased until renewed in the usual way. It therefore becomes necessary that an extra effort be made by our successors to work up a good membership for the Society in the current year. And we would further recommend that as soon as possible proper accommodation be provided for the safe keeping of good, thoroughbred stock on the show ground. A visit to a few of the Township Exhibitions has taught us that East Grey has within its limits some of the very best thoroughbred cattle Ontario can boast of, and unless your Directors make provision for the safe keeping of such valuable stock, we need not nor can we expect them to be brought upon the grounds. We believe the services rendered to the country by those enterprising agriculturists who bring good thoroughbred animals into our midst is under-estimated. Mixed farming is generally admitted to be the best for this part of the country; and as feeding rough, scrubby cattle does not pay, therefore the necessity of improving the grade is evident, and in the various neighbourhoods throughout the Riding where thoroughbred Durham bulls are kept, it is very pleasing to notice the vast improvement there is in grade cattle. Therefore every possible encouragement should be given to the importers of good thoroughbred cattle into this country. Sheep are likewise becoming a very important part of farming, the country being well adapted for that purpose. Of these we had a good display at the Fall Exhibition. Sales were effected at remunerative prices. The parties purchasing having for their object the improvement of their flock, will no doubt be well repaid. We wish them good success. The show of horses was good. A vast improvement in this class was evident. Improvement in pigs is very noticeable, caused by the importing of good stock. Of these we had some very fine specimens shown, but not as many as we should have liked to have seen. The poultry was fairly up to the average. In implements every year seems to show an improvement on the preceding one. The display, on the whole, was grand throughout. Fall wheat was excellent; barley, peas and oats were likewise good. Spring wheat was up to the average in quality; but for some reason hard to be understood, is not yielding so as to sufficiently remunerate the producer. There was a good exhibition of roots and vegetables, and of these there has been an abundant crop. There was a large display of dairy produce, excellent in quality. The show of fruit was likewise No. 1. In the departments of ladies' work, manufactures and fine arts the exhibits were numerous, beautiful in design and finish, and reflect great credit on the exhibitors.

In conclusion, it becometh us to acknowledge that we are the recipients of many favours which tend to make the people of a country happy and content. The educational system of our country is good; we have good laws to be governed by; the people are generally law-abiding and orderly. We are the subjects of a noble Queen, and are proud to live under her sovereign sway; we have reaped an abundant harvest. For these, with all other blessings liberally bestowed, we have a right to give thanks to that Great Being who alone giveth us all good things.

HALDIMAND.

Your Board, in presenting their Annual Report, congratulate themselves on having to report the greatly increased progress of the Society. The last Annual Exhibition was a most successful one, and highly encouraging. The show of horses, cattle, sheep and pigs was good, showing a gradual improvement at each successive exhibition. A much larger number of entries made than formerly, in almost every class, made the show decidedly superior to any former one.

The domestic manufactures and ladies' work showed a great improvement. The show of grain, roots, fruits and dairy produce was excellent.

Your Directors would recommend that a two days' show be held, as the various Judges, particularly those on horses and cattle, have to hurry over their work so that they may be able to get through their arduous duties before nightfall.

They would earnestly urge on the members of the Society the desirability of enlarging the show grounds, by procuring new grounds, as there is no land procurable adjoining the present that it would be possible to obtain.

HAMILTON, E. D.

At the close of their term of office, and in compliance with the requirements of the Agricultural Act, your Directors beg to submit their Annual Report.

The Exhibition of the Provincial Agricultural Association, being held in Hamilton this year, this Society, in accordance with its usual custom, handed over to the Association the amount collected for members' subscriptions, which placed our members on the same footing as those of the Association; and your Directors did everything they could to assist in making the Exhibition a success, and that their united efforts were not unavailing may be inferred from the charge of the Hon. Justice Wilson to the Grand Jury at the late Fall Assizes, wherein he stated "That the display of the products of the soil could not be equaled by any State or County on this continent; and that the progress and success of our manufacturers, as years give them strength, is enabling us to hold our own with the world." Such commendation from such a source cannot be otherwise than gratifying.

The Council of the Agricultural and Arts Association have concluded that an exhibition extending over two weeks is not calculated to replenish a depleted treasury; and while we agree with them in the conclusion, we take decided objection to the selfish system they have adopted of using a portion of the two weeks for their exhibition at a time when every day is valuable, and other associations are thereby compelled to carry their shows late into the season to avoid conflicting with each other.

The Report of the Agricultural Commission appointed by the Ontario Government will, we presume, be published shortly, and we would add our recommendation to the Minister of Agriculture to be as liberal as possible with the circulation, for from the labours expended by the Commission, and the variety of sources from which it has been obtained, it cannot be otherwise than of incalculable value to every one interested in the cultivation of the soil. The export trade of nearly every product of the farm is assuming such proportions that any additional information on the subject must be of interest to the producer, and we have no hesitation in saying that a careful perusal of the Commissioners' Report, and an intelligent action in using the information in it, will materially assist to release the mortgage on many a farm and give the farmer's wife and daughters the means to add countless attractions to the home circle.

We deem it in the interest of the members of this Society to refer to the extensive establishment for canning fruit and vegetables about to be erected in this city, and would recommend those interested in the production of such articles as this company requires to get early information on the subject, which will enable them to make timely provision to supply their wants, and the result of the experiment will, we trust, be a source of profit to both.

Your Directors desire to record their obligation to the City Council for the valuable addition they have made to the Exhibition buildings during the past year, and the Council can still further earn our gratitude by making much-needed alterations in the horse ring, which in its present condition is both difficult and dangerous to drive in. To the citizens who have assisted us so liberally in the past we again express our thanks, and we trust they will aid us in making our next Fair creditable alike to the city and to the "garden of Canada" which surrounds us.

The financial statement shows an amount of \$817.92 at the credit of the Society.

HASTINGS, NORTH.

Our Annual Show, held on the 7th of October, was in the opinion of those who have been in regular attendance considered the best for a number of years. The exhibition in almost every class excelled that of the preceding year. The show of cattle and horses was good. The entries in sheep were large, and many of those shown were considered by those well qualified to judge to be superior to those exhibited at some of our central fairs. To those who were present it is needless to say anything of the display in farm produce. We venture to say that the roots and vegetables shown far excelled any ever before exhibited in North Hastings. A new variety of potatoes that was this year added to the list (the Early Vermont) particularly attracted attention as being both large sized and well shaped. Although the accommodation was so limited the display of fancy goods in the ladies' department was really excellent, as was that of fruit and dairy produce, the Judges in both classes expressing themselves to the representatives of the press who were in attendance as being satisfied that they were far superior to the exhibit of former years. It is also very gratifying to your Directors to be able to state that the membership for the past year exceeded that of any other for the last ten years. We are also pleased to be able to say that everything passed off at our show harmoniously, with little or none of the quarrelling and drunkenness that generally attend our country shows.

We all should be thankful to the Giver of all good for the return of prosperity which has been so evident in this section of the country during the past year. Our crops have been excellent, the prices good, that of cheese alone being double what it has been for the past two years. Surely the farmer that could complain must be a sluggard.

Dungannon and Faraday.

Your Directors feel pleasure in meeting you once more to place before you their accounts, etc. After meeting all liabilities, you have a balance in the hands of the Treasurer of \$22.35 to start the new year with, also twenty-three paid up members. Your last Exhibition was a great success; it was said by disinterested persons that they never saw a better sample of articles shown, not even in the front Townships. It is very gratifying to your Directors to notice the increased interest beginning to show itself in keeping, breeding and raising of sheep, for it has become a known fact that there is not a more healthy district in the Province for keeping and raising sheep. The fact is we only need a railroad, and then in a little time we should become exporters of all sorts of farm produce, which would be fit for any market in the known world.

HURON, WEST.

Goderich Horticultural Society.

The fruit crop of the past season has been the largest ever gathered in this county, and we never saw a better average of fine specimens, showing that as a rule better care is being taken by growers of their trees.

Strawberries—Strawberries were not much over half a crop with our largest growers. Mr. Fred. Seegmiller, of Goderich Township, and Mr. John Stewart, of Benmiller, report the yield as about 2,500 quarts per acre, whereas smaller growers report the crop as very large. In cases of small garden plots we can readily see that more attention is given to the plants; they are kept clean and the soil well worked and fed. In three instances where the plots were stirred and some fine manure worked into the surface, the last ripening berries were as fine and large as any of the season. We did not hear complaint of winter-killing or insect enemies among growers. The large growers still grow Wilson's Albany for shipping. Among other growers we find Arnold's No. 3, a fine, healthy, strong plant, berry about as large as Triumph de Gand, grain very fine, melting, delicious, a good table berry. Arnold's No. 23 resembles No. 3, but the berry is more flat and does not appear to be so prolific a cropper. Sharpless is highly spoken of—berry large and sweet, but fruit-stem slender, allowing the berries to grovel in the dust. Windsor

Chief would be a popular variety for market, only that it has too much vinegar in its composition. Cumberland Triumph is well liked—large berry, flavour good and fairly firm. Mr. Latouzel, of Cherrydale farm, imported plants of the Alton Pine from the Island of Jersey. They have grown fairly well, but seem rather weak, do not stool out freely; they were not allowed to fruit, but will doubtless bear the coming season. Large growers find a ready sale at from six to ten cents per quart. There is no crop that a householder who has a small piece of ground can grow with more satisfaction and profit than strawberries; they ripen at a season when the system seems to demand a change; they are health-giving, and one of the few luxuries that the poor man can as well afford to enjoy as the rich man.

Raspberries—Raspberries are not cultivated in this county excepting in a few isolated cases. The supply of the various varieties of wild raspberries is large, and prices are not high. Besides, there appears to be a prejudice against growing raspberries in the garden for fear of their spreading and succoring so as to take full possession of the premises. One grower near Seaforth says that he got a variety sent out several years ago by the Fruit Growers' Association; it grew well and bore also, but spread so rapidly by succoring that he began to root it out, and he seriously declares that it took him several years to get rid of it. Mr. J. S. McDougall, of Goderich, grows one of the varieties of black cap to perfection, and he would not be without it.

Currants—Currants are very generally grown in gardens, mostly for family use. The red and white varieties find a market at six cents per quart, while Black Naples is worth ten cents, and those who know the preserving quality of Lee's Prolific willingly give twelve cents for it. It would pay to grow black currants for the market; they are always in demand and can be shipped to a distance without fear; they are easily grown, not subject to disease, and the currant worm never touches them, while it strips every leaf off the red and white varieties.

Gooseberries—Gooseberries are only grown by amateurs for home consumption. Almost all the known varieties have from time to time been tested, but now growers are satisfied with Houghton's and Downing's Seedlings and Smith's Improved. Houghton's is the favourite, being the largest cropper and a fine berry for preserving. The English varieties all mildew badly, in spite of all the remedies tried so far. A successful grower in Perth County says he saves all his varieties by sprinkling the bushes with a light solution of common molasses and soft water. If there be any virtue in this it will doubtless be discovered the coming season.

Grapes—Grapes were a large crop generally, and we never observed finer specimens than upon the Exhibition tables the past season. Almost everyone who has a piece of land in a town or village grows grapes, but farmers are slow to take up the cultivation, and when they do purchase vines, we are sorry to say they too often get some of the new varieties offered by travelling agents that, in a majority of cases, turn out worthless. There is no section of Canada better adapted to the growth of the grape in the open air than along the shores of our lake, especially on the light soil around Goderich. All the leading varieties can be grown here in the open air successfully. Those who have vineyards in Huron find ready demand for all the fruit they can grow at good prices, and hence wine-making has not been tried excepting by amateurs for home use. Some growers complained of mildew the past season, especially affecting Rogers' Hybrids. Arnold's Brant mildewed very badly, but no trace is reported upon Concord and Delaware. Burnet fruited in a few instances, bunch large, berry large and very fine in quality. The only objection we have heard is that fruit does not set well on this new variety. Growers will find in a year or two, when the vine gets aged, that this objection will be removed entirely, and then our friends will be delighted to find that the Burnet is one of the finest varieties grown. We are glad to note fewer complaints of rot in the grapes than usual. Mr. J. H. Williams continues to grow his Seedlings, Nos. 1, 2 and 3; they have been fully described in former reports; they are hardy, prolific and desirable. But the public desire appears to be for a white grape that would stand in its class as the Concord does among the black. Pocklington has been purchased and planted, but if we are to judge by the universal reports upon this variety both in Canada and the States, it will never be worth ground room; it is generally ranked as a third or fourth class grape in sections where it succeeds

in the States, but it is not expected to succeed at all in Canada; it ripens too late, and even when ripe is inferior in quality. But if growers have patience a little longer, we believe they will obtain just what they want in the Niagara, a new variety that will be distributed next year. It is hardy, prolific and of very fine quality. Let every grower secure it, and we feel satisfied no one will complain this time. The Niagara is as surely the white grape for the million as the Concord is among blacks.

Cherries—The crop was abundant, but scarcely any escaped the rot in some sections, whereas others report more favourably. The common red still appears to hold the market for preserving purposes. One grower says that there is little use in attempting to save a crop from the rot, as the robins are sure to carry off whatever may be left.

Peaches—The popular demand has been in favour of extra early peaches for value, and accordingly growers are induced to plant whatever is represented as of good quality and early. Alexander is growing in favour for its fine colour, good size and fair quality; in this district it comes in first, ripening about July 18th or 20th. Early Beatrice is high-coloured and fine plum flavour, but too small to be valuable as a market variety. Amsden's June closely resembles the Alexander; so much so that it appears hard to distinguish them apart. Our local market was flooded the past season with Seedling peaches, many of them being very inferior in quality, and lacking in size and colour. Any grower can see at a glance how foolish it is to be giving ground room to inferior Seedlings, when we find such selling at fifty cents to \$1.25 per bushel, while good varieties bring from \$2.50 to \$4, according to season, size, colour and quality. However, when a good Seedling can be secured it is well to keep and propagate from it, as it is more likely to live and bear heavier and more regularly than imported varieties. Mr. George Cox, of Goderich Township, has four Seedlings of rare excellence. The trees are old and very strong, they bear regularly heavy crops of excellent fruit that will compare favourably in the market with any of the known sorts in their season. No. 1, a free stone, ripe about September 1st, large, rich, yellow flesh, flavour strongly resembling Early Crawford and of about same colour. No. 2 clings slightly, flesh light in colour and very juicy and delicious, ripe about 5th September, high-coloured and large. No. 3, light-coloured, with pretty blush on cheek, large, juicy, flavour very good, ripe September 5th. No. 4, light-coloured, with good cheek blush, free stone, flavour agreeable, tart, flesh greenish in colour, ripe September 6th. These peaches could be shipped a long distance if picked in proper season, the skin being thin and very tough. The curculio has not damaged the peach crop to any extent here, and even the borer is not complained of much. The peach crop of 1880 was the largest yet grown in Huron. We have not yet observed any case of yellows in this county.

Plums—Growers are still discouraged and seem to leave the crop to the curculio, with a balance always for the rot to carry off. Still the market was fairly supplied with plums the past season, and, although the shipments did not come up to those of 1879, they were considerable under the circumstances. The common blue seems still to keep the lead among those we find in the market. Fellenburg has been reported as a good grower and bearer, not subject to rot, and the curculio does not care to touch it so long as any other variety can be had. We are cultivating a very fine specimen of fine mottled red and yellow plum, and have great hopes of it; it is very large and flavour excellent; appears free from rot and curculio.

Pears—The crop of 1880 was immense and quality very fine. There is evidently an advance in pear culture among us, and growers are testing all the most modern popular varieties. The Bartlett still holds first place in the market, and the general opinion is that it will be long before a superior variety can be had for general cultivation. Clapp's Favourite succeeds admirably, is a good and regular bearer, and its high colour makes it the most attractive of any early variety; flavour is good also when taken in proper time, but it does not keep long. Flemish Beauty succeeds well, does not spot or crack as it does in many other sections. Beurre Clairgeau has been one of the most profitable shippers, bringing from \$10 to \$15 per barrel in Montreal, according to size and colour.

Apples—So large was the crop of the past season that farmers were feeding their live stock with apples freely, converting them into cider, and drying them in large quantities. In the market second quality fruit would not sell at all, and even the finest specimens.

would bring but \$1 per barrel at the best, while wholesale buyers could get all they wanted at seventy-five and eighty cents per barrel. The shipments from Goderich alone for the European market were larger than we have ever before known the shipments of the entire county to that market. In fact the Canadian market was so glutted that buyers could not profitably ship elsewhere than to Britain. It pays any buyer to make a careful selection of fruit for export, see that all are without a blemish, free from worms and as nearly a medium size as possible. Large apples are not wanted in the British market; a medium size is preferred, and generally speaking a high colour is most popular. The price in every case depends upon the quality of the fruit in these points. But yet Ontario apples are not appreciated in the British market as they deserve; they are not graded in market value according to actual merit, but rather according to colour or some peculiar popular fancy for fine form. To us it seems ridiculous that Newton Pippin should occupy the highest place, whereas Rhode Island Greening is fast going down in public estimation there. We know of instances where in Liverpool the Gilliflower brought \$4.25 per barrel, while Rhode Island Greenings only reached \$2.25, and Spy \$3.50. But on the other hand it is refreshing to find fine specimens of Swayzie Pomme Grise bringing \$5.25, and American Golden Russet \$4.30 to \$4.60. Mann apple in one case brought \$3.20, while Cabashaw reached \$4.10. Upon the whole, for the entire season, with all shippers, we believe the Baldwin has proved the most profitable apple. We have a report of one case where small Baldwins, considerably under medium size but high coloured, brought a higher price than larger fruit of the same variety that had not the same colour. Upon the whole, we feel convinced that the British rating upon Canadian apples requires readjusting from beginning to end, and when our apples are rated upon general merit of character we will, upon the whole, get better prices than we do now. As it is, apples grown in Ontario bring fifty cents to \$1 more than American apples. Shippers find obstacles in the way of a trade with Britain also; they tell us that the only way to make profit in exporting fruit is to go over with the cargo and dispose of it. The commission men almost invariably make a loss for their customers; they pocket the lion's share themselves in the shape of all sorts of imaginable fees and charges. Apple growers are not adding new varieties to their list; indeed, the general impression is that too many varieties are grown already. Especially is this the case with summer and fall varieties, which the past season were a mere drug on the market—so much so that shippers could not afford to pay more than fifty cents a barrel for the best fall varieties. Growers will top graft the most of their fall and summer trees with some of the best winter varieties after the experience of the past year's crop. At one time we hoped the North-west would open up to us as a market for our surplus fall fruit, but shippers did not as a rule find that a good market on account of the high rates charged for transportation. Mr. W. J. Hayden, of Ashfield, has a Seedling apple from the Bourassau; it resembles that variety in form, size and colour, but in quality, to our mind, is better. Bourassau is good when used early in winter, but if kept into January becomes tough and loses its aromatic flavour. Not so with this seedling—it will keep well up to March or April, and retain its fine, fruity flavour to the last. The tree is an immense bearer and the fruit nearly all of a size, which would make it a profitable apple for shipment to Britain. Mr. Latouzel, of Cherrydale farm, has several of the leading English sorts growing in his orchard, some of which are in bearing, but so far as we have seen they will not compare favourably beside Canadian varieties.

ANNUAL EXHIBITION.

Our usual Fall Exhibition was held in connection with the West Riding Agricultural Show, and, as usual, was a grand success, the tables being loaded with choice specimens of all varieties of fruits grown in our section. It is gratifying to observe the improvement in a knowledge of fruits among our patrons, and how skilfully many of our growers can arrange large collections so as to give the finest varieties. But we recognize the great difficulty that every Society has to contend with in obtaining judges who are fully qualified to make awards. We still select outside men as judges when they can be got, and find this a good rule to follow.

Diseases, Insects, etc.—*Blight* has been very prevalent in pear trees the past season, in many instances destroying the whole tree. It appears to affect Flemish Beauty worse than any other variety, although all are more or less affected. Apple trees suffered badly in some sections also. The blight cut off the young wood entirely in some orchards of Rhode Island Greenings. Keswick Codlin was badly affected. Linseed oil has been used as a wash in a few pear orchards, and blight did not affect the trees washed, although some that were not washed were badly blighted. It is a simple wash, cheap and easily used. It should be applied early in the season with a piece of sponge or old cloth saturated with the oil. Rub the trunk and large limbs lightly, and then scrub well with a coarse brush. We await a further report on the matter, and trust our fruit growers will give this a thorough test.

Black Knot seems to flourish. No one appears to cut it out. Pity the law could not be enforced in this matter. It remains a dead letter for the want of proper machinery to carry it out.

Rot has not lessened in plums and cherries, but we have not heard so many complaints of grape rot this year.

Curraut Worm—This little pest has been very bad again, but the remedy is always effectual when used in time. White hellebore used when they are very small will destroy them at a single application.

Curculio is not likely to be destroyed by any remedy, as the tedious jarring of the trees is the only effectual way of getting rid of it that we know. This, like other pests of the kind, will, no doubt, some day take leave of us—at least we hope so.

Codling Moth is still with us, but no worse than usual.

Birds—It is time that the law that protects birds should be changed, as far as the robin is concerned at all events; indeed, the cherry bird might be included. Both are very destructive to the cherry crop, and they do not appear to do corresponding good. English sparrows have been observed eating the currant worm, and also searching cabbage heads for the cabbage worms. Possibly they were hungry at that time, as they do not generally appear to care for much else than grain and seeds.

The Season—Thus far, although the winter has been the severest known for many years, no damage has been done to fruit buds. Even the peach buds are safe and healthy, although the thermometer reached 7° below zero. We tested the matter by taking pieces of branches from trees in different sections and placing them in jars of water in a warm room. In a few days they came out in fine bloom. Had the fruit buds been destroyed the leaves would have come out, but the fruit buds would become dark, swell and drop off. Should the winter continue favourable the prospects are excellent for a crop of peaches and pears next year at all events.

Orchards—There is no spot about the farm that should be in better condition than the orchard, and yet we are sorry to say it seems to be the spot of all others the most neglected. There is not an equal quantity of land under any other crop upon the farm that will yield so large a profit to the acre when properly attended as the orchard, and yet the majority of the farmers are blind to the fact. It is painful to travel through the country and see orchards on every hand neglected, never fed or cultivated, and the trees mutilated now and then by way of pruning. Some orchards are in a fit state to foster disease, for bearing trees that are seldom or never manured cannot produce good healthy fruit year after year, and what they do produce must relax and weaken the trees so that they are rendered more liable to fall into decay or contract disease. No agriculturist worthy of the name would expect to reap a crop of grain or roots year after year off the same piece of ground without cultivation and manuring, and yet we find orchards thus treated the exception rather than the rule. Find us a farmer who says his orchard pays him well, and we can point to a man who manures his trees well and prunes carefully and regularly. Pruning appears to be done at random in most orchards; large limbs are cut out to admit sunlight and air, whereas if the tree was trimmed regularly from youth, keeping symmetry and proportion in view, this system of butchering would not be necessary. As a rule, when the majority of orchards are planted out, the trees are placed too close together; this is a foolish and a mistaken economy of ground; it would be more profitable to have one-half the trees planted at such a distance as would admit of abund-

ance of sunlight and air when the trees grow large. Let every orchardist see to it that he drains the land well and feeds his trees regularly and keeps them well trimmed, and we can answer for it that the quality of fruit will be better and the crop more regular and larger. Salt has been experimented with in several orchards in the county for the past three years, and proof has been obtained as to its beneficial results in assimilating the various substances in the soil and keeping down diseases and insects. The quality of fruit where salt has been liberally used is very marked; we find the general points of flavour more intense and the skin clearer, and free from spotting.

Shelter—Now that the forests have been mostly cleared off, leaving large tracts of country bare, it is time that the subject of shelter should be considered, and when we suggest *shelter*, we do not mean a close thicket to stop winds, but rather a windbreak. If Riding Societies could offer proper prizes of sufficient value to induce farmers to beautify and protect their farms by planting shelter belts, we feel satisfied much good would result. Municipalities might also consider carefully the advisability of accepting in lieu of taxes a certain extent of roadway tree planting in order to induce property owners to do what at present they do not appear to have good taste enough as a rule to do for themselves. A farm neatly fenced, the public road passing it planted out with an assortment of maples, elms, basswood, birch, etc., the orchard protected with a belt of Norway spruce, and the barnyard with another such belt planted closer, and belts of forest trees planted on the north and west sides of the farm to break the severe winds, would be enhanced in value far beyond the actual cost of such improvements. Add to this by way of refinement a neat front garden plot, with two or three beds of assorted flowers and a few of the best flowering shrubs, and we have a farm worthy of notice.

Hedges—With the growing scarcity of timber, fencing is becoming an item of great importance. A few have tried hedges on a small scale, but as a rule have not given proper attention to the matter to insure success. We have a few instances of good hedges in the county, mostly buckthorn, but for want of proper training when young, some of them have not formed properly. Mr. M. C. Gordon, of Goderich Township, has a hedge of Osage orange that makes a complete barrier against stock, but it requires frequent trimming to keep neat, besides the plant is too tender to be of value generally. To our mind there is nothing equal to berberry for hedges. It grows into thickened stools, but does not spread from cut roots, so that the land can be cultivated close up to the hedge without fear of spreading the plant from broken roots as Osage orange does. It transplants easily and grows freely, is quite hardy, and both defensive and ornamental. Indeed, it has all the needed good points to warrant us in believing it will be yet the roadway and division line fence of the farmer. Nothing could be handsomer in summer or winter.

Plants and Flowers—We have to record one of the finest seasons in connection with plant and flower culture ever known here. Our exhibition tables contained an abundance of almost every description grown in this section, all in fine order. The show was rather late to give Asters in full bloom. Greenhouse plants generally were remarkably fine for this section. All through the season Dahlias were fine, strong and healthy, owing to occasional showers. Gladiolus were very fine, and many new varieties were added to the collections of former years. Phlox Drummondii is very evidently a general favourite, for the competition was keen. There was a decided improvement in cut flowers from former years, especially in the tasty arrangement in bouquets, the fine blending of colours and mixture of varieties and sizes. It is also gratifying to report that plant and flower culture is extending rapidly, and the result of our past exhibition has shown a large proportion of prizes taken by amateurs, whereas our gardens and greenhouse men used to carry off the lion's share. Coleus never adorned our horticultural building before in such variety of hue and cut. Mr. A. Watson's newer varieties were especially fine. Roses are usually out of bloom before our exhibition time, and hence we never find an opportunity to criticize this choice class. We find very little trouble in overcoming the slug on the rose. Hellebore, water and alum boiled together compose the wash, which applied with a syringe once, or at most twice, in the season proves amply sufficient; the proper time to apply is just as the plants are coming into bloom. Verbenas were very fine, and we see no reason why they cannot be successfully grown in any sec-

tion. Some growers complain that they run out when grown year after year from cuttings. We do not doubt but there may be some truth in this, but our experience is that the want of good soil and proper cultivation has more to do with the complaints so often heard; the Verbenas must have virgin soil to grow in perfection. Scarlet Geraniums still hold a prominent place, both for bedding out and window; the newer varieties of doubles are very popular, being free bloomers, and they come in so many varieties of colour. Petunias, both single and double, are to be had now in much finer variety than ever heretofore; especially do the fringed doubles deserve notice. There does not appear to be an end to the variety and shade of the Pansy; we only wonder that this beautiful flower is not grown by everyone; it would thrive anywhere and will beautify any corner of a garden plot. Especially late in the season, when the bloom has left so many others, the Pansy looks grand; the cooler fall weather seems to bring out their beauty. Plant them in the same bed with the Gladiolus, which lacks foliage, and together they form a very fine bed.

Vegetables—The crop has been abundant. There are now so many varieties of potatoes being tested that it is difficult to make a selection of one variety for the million. As yet we have not had any to equal the Rose for general cultivation, but many claim that it is running out. Beauty of Hebron is well liked for early use, but would not answer for a full crop. The potato bug is no longer looked upon as a formidable enemy in the face of more destructive ones in our fruit orchards—some even claim a benefit from its presence as providing food for poultry. White Leghorn and Black Spanish fowls are very fond of potato bugs, and with the help of a few ducks to gather what bugs may be under the vines, a dozen or two such fowls will keep a good-sized potato plot clear of bugs. Onions were badly affected with the grub in light soils, but an application of lime and some salt is said to destroy them. The cabbage worm was not generally so bad as in former years. One grower says he uses hot water to destroy the worm; he pours it over the head and says it is effectual, while doing no harm to the cabbage.

Sorgum—Some three years ago a few farmers along the lake shore procured seed of several varieties of the sorgum, or sugar cane, for the purpose of testing, and although at first it did not appear to give promise of future value, it was soon discovered that the fault lay not in the extent or quality of the grown crop, but in the manufacture of syrup from the cane. For the first two years the syrup was of inferior quality owing to the crude method of manufacture, but now that more perfect machinery has been secured, and a better system of refining adopted, the syrup is of such excellence in quality that it finds ready sale in the local market at remunerative prices. The early amber variety is unanimously pronounced best by all growers, both for a crop and for the quantity and quality of syrup produced from the cane. While sorgum will thrive well on light, stony or sandy soil, it will pay to give it good soil and cultivation. Deep ploughing and subsoiling will prove a decided benefit, as the roots of this plant penetrate so deep. It should be planted in drills about three feet apart. In a few days it will shoot up, and at first appears so tender that it may be mistaken for foxtail or some other wild grass; but as soon as the roots have commenced their downward and outward spreading through the soil, the cane shoots up with great rapidity and strength. Before growing higher than one to two feet, the plough and scuffler should be run through the field and any thinning that may be necessary done, after which it needs no further care until matured for harvesting. The cane will not injure by a slight frost, but if the frost penetrates the cane fermentation evidently follows, and the syrup made from it is of a very dark colour and disagreeable both in taste and colour. Those who have cut the cane early, while the seeds are in the milky state, assure us that they get the best syrup and of a much clearer colour. But as we are yet only experimenting, further tests may divulge new light on this as well as other points. The average yield reported by growers in this county is from 100 to 165 gallons of syrup per acre. But when we consider the fact that as a rule the crop has been grown upon poor or medium soil ploughed as for an ordinary crop, we conclude that upon superior soil, under-drained, well worked and subsoiled, the early amber cane can be grown to produce a very much larger yield of syrup, and probably of a finer quality. On our local markets the syrup sells readily for 60 cents per gallon. We would strongly recommend farmers to thoroughly test sorgum in every section and under

all circumstances, and we have no doubt but that soon a much higher state of perfection will be attained in the manufacture of syrup as well as cultivation of the cane. No one need fear giving a trial, and it will grow freely wherever the common Indian corn will succeed. This is certainly a matter of great interest to our country, as the forests are rapidly disappearing and the manufacture of syrup from the maple tree has become almost a thing of the past. Indeed our seasons have changed so that, even if he would do so, the farmer cannot find time to secure a supply of maple syrup. Besides, the labour and expense is much greater than it becomes necessary to expend in order to produce a like quantity of syrup from cane. We hope another season to be able to report some very interesting statistics from both growers and manufacturers in this county. All agricultural societies should offer liberal premiums in order to encourage the cultivation of the early amber cane. The local Government might also aid by way of a grant similar to that offered for the manufacture of sugar from beets. While discussing the merits and demerits of the Agricultural and Arts Association in connection with the grant of \$10,000 to that body, some members stated that they would like to apply that amount where it would best further the interests of agriculturists and withdraw it from the Agricultural and Arts Association. We believe no better appropriation could be made than a division of that \$10,000 among the various districts for the purpose alone of encouraging the cultivation of early amber cane and its manufacture into both syrup and sugar. This must, we believe, do away with the possibility of the manufacture of sugar from beets, as any farmer can produce a much larger return at a far less expense.

Library—The library of our Society has always been well patronized by members. We are now about to make a large addition to it of some of the latest and best works that appear to us most likely to do good.

Warning—Once again we would counsel fruit growers in Huron to exercise great caution in dealing with travelling agents. Every year we find out so-called new varieties of various kinds of fruits where the trees or vines had been purchased upon the golden opinion of the agent, whose only anxiety ever is to make sales and thereby swell his commission. Many a dollar could be saved by referring to us before giving an order for any new variety offered. The past season we found parties who had purchased grape vines at \$1.50 and \$2 each, which we could get for 30 and 50 cents respectively. Another agent sold roses at \$1 each, that local growers could supply for 25 cents. A Clematis was sold for \$3, worth 60 cents at the highest, and one agent actually took several orders for the Beauty of Hebron potato at \$1 per lb., while the same variety could be bought on our own market at not more than \$1 per bushel. We might enumerate many more such swindles. Now, we will be very glad to hear often from intending purchasers, and will give full instructions as to the proper and most profitable varieties to grow. We will gladly investigate thoroughly into every new variety of fruit, flower or shrub offered and report the result, and if we succeed in saving horticulturists from loss by preventing them from purchasing worthless stock, we will be amply rewarded for our labour.

HURON, SOUTH.

The past year's operations have been on the whole satisfactory. At the Spring Fair at Brucefield the sum of \$304 was offered in premiums, and \$177 awarded. Though in some classes there was a meagre display, yet on the whole the stock exhibited, particularly in the draught horse and Durham classes, was remarkably fine.

The Fall Fair at Exeter proved a grand success, and the days of the show being fine a great concourse of people assembled on the Fair grounds. The large sum of \$454 was taken at the gates; the sum of \$1,273 was offered in premiums, and of this amount \$941 was awarded. The display of manufactures, grain, dairy produce, fruit, etc., was quite up to the average, whilst the stock department was confessedly ahead of any previous show.

The crops of this County for the past year have on the whole turned out well. Fall wheat, our main staple, has yielded on an average about twenty-five bushels to the acre; quality fair, but not equal to last year. Fall having taken the place of spring wheat to a

large extent, would show that the area sown to fall grain is the largest ever grown in this County. Spring wheat has been a miserable failure, and farmers seem to be abandoning its cultivation in despair. The pea crop is once more ruined by the beetle, and as in the case of spring wheat, our insect enemy has gained the day. It is much to be regretted that some plan cannot be devised to destroy this parasite, for it may truly be said that the pea holds the same place in Canadian that Indian corn does in American agriculture; no rotation of crops seems complete without it, and when we lose it we lose the best preparatory crop we have for fall wheat, and the grain of all others the best adapted for feeding purposes; barley and oats are a poor substitute, and as Indian corn is not cultivated to any extent we have nothing to fill the vacant place. Oats were above the average in yield, but the quality of the grain is inferior to the crop of 1879. Barley an inferior crop, many fields not turning out over fifteen bushels to the acre. It is to be feared that this valuable crop will, in the future, be affected by the same enemies that have proved so destructive in the case of spring wheat. Early varieties, very early sowing, and a liberal dressing of salt appear to be the best safeguards. The hay crop of 1880 was a good average one, but about fifty per cent. was almost ruined by the heavy rains of July. The fruit crop of 1880 has been exceedingly fine, both in quantity and quality, and the exportation of apples from this County will probably double that of last year. We may remark in passing that greater attention should be paid to the cultivation of fine qualities of long-keeping apples, as the sales in England show that between average and first-class fruit there is a difference of ten shillings per barrel, freight and charges being of course equal. Our cheese and dairy interests had a most successful season, and those who have steadfastly adhered to this valuable line of farming have during the past season reaped a rich harvest for their labour. The report of our root crop Judges, which has been published *in extenso*, shows that where liberal dressings of salt, barnyard manure, etc., have been applied to the land the yield of mangolds, carrots, and turnips has been most extraordinary, and it is to be hoped that the experience gained in the past year will result in the more extended cultivation of this class of crop, so valuable to the feeder, the stockman, and the dairy interest.

We note a continued improvement in our breeds of horses, and the valuable importations made in 1880 will doubtless tend to still further development. Great strides seem to be made in the breeding of cattle, more particularly in shorthorns, and most of our breeders have already disposed of all their serviceable stock. It was encouraging to see the number of well-bred young cattle exhibited at Exeter and other fairs in the County, the result of the introduction of pure bred stock into Huron. Should the interest now taken in cattle and the English demand continue, we may safely predict that in a few years this County will rival Wellington and other famous stock raising districts in Ontario. In sheep and pigs the old favourite breeds still maintain their ascendancy, and the general quality of the stock of this County seems to be gradually improving.

In closing this report, your Directors cannot but congratulate the members of this Society on the improved condition of the agricultural and other great interests of the County during the past year, and express the hope that the new year may have equal favours in store for us all.

KINGSTON, E. D.

The Directors beg to report that during this year it was considered advisable to only hold the summer show, that the members might prepare for and assist at the Midland Central Fair held in September.

At the Exhibition held in July, the Flowers and Vegetables were good, but nearly all the other classes were deficient both in quantity and quality.

No cause can be assigned for this, other than a want of greater interest being taken by the members to make the show more complete.

It is to be regretted, that, notwithstanding the prize list being very extensive and the prizes offered liberal, yet there is not that interest taken by the public that should be to make the Exhibition more attractive; for that reason it will be better to allow the present year to pass without holding any show in 1881, in hope that it will have the effect

of causing the members to use their influence and assistance in order to have the Exhibition in 1882 a perfect success.

From the Treasurer's financial statement for the past year it will be observed, that after paying all general expenses and premiums awarded at the Summer Show, there still remains to the credit of the Society the sum of about five hundred and thirty dollars.

KENT, EAST.

The Directors in delivering up the trust confided to them at the last annual meeting desire, in conformity to previous usage and the requirement of the statute in that behalf to submit a brief statement of the operations of the year just closed, and to direct your attention to anything which requires consideration with reference to your proceedings for the time to come, and also to place on record a brief account of the past season and its effect on the agriculture of the country.

We attempt no elaborate report, but the following simple statement will be sufficient to show that this Association has attained to a degree of power and efficiency never equalled in any former period of its history.

The past season has been an exceptional one in many respects. A very mild, open winter was followed by a dry spring, causing a short hay crop, then succeeded a very wet summer, which many believed was the chief cause of the potato-rot, but in other respects the season was a very productive one. Wheat was about the average, oats rather light, barley good but damaged in quality by the wet; and in fruit, both large and small, the yield was enormous. Everything being taken into consideration, the fair yield and good prices, the farmer has great reason to rejoice and be thankful for the prosperity which had on the whole attended his labours, and that we have been blessed with health, peace and plenty, in our happy land.

At the first meeting of your Directors it was thought advisable to make a departure from the old routine, by introducing some new stock into the county; therefore your Directors imported three young bulls from some of the best herds in the country. These were sold by public auction and have given good satisfaction to the purchasers, clearly demonstrating the wisdom of the step.

The Spring Fair was held April 20th, 1880, and we thought it advisable to show bulls as well as stallions in the spring, as that is the season breeders generally select and purchase for the coming season; as experience has shown that the fall exhibiting has of late proved a failure to a great extent, the finest of the animals shown being shipped and sold for beef during the winter, thus depriving the county of their services.

There was also a special prize given for heavy draught stallions, to encourage and develop the breeding of a heavier class of horses; your Directors having noticed that this class brings a far better price than light horses, and hence should be encouraged.

We deemed it advisable not to hold a ploughing match, great difficulty being experienced heretofore in finding a field, as the farmers in this section do not wish to have any prize ploughing done on their farms, as they consider one year's crop, or nearly so, lost. The American style of plough is all the rage in this section, and is not very well adapted for the old style of prize ploughing.

The Fall Fair was held on the 4th and 5th of October, was quite up to former fairs and in some departments far exceeded them, particularly in fruit. Apples were shown in abundance and of first-class quality, and just here we would call your attention to the fact that we sent, in the name of the Society, a selection of apples to the Provincial Exhibition at Hamilton, and though not getting a prize, in point of size and quality compared more favourably with other sections, and we deem it advisable for future Boards to continue to exhibit and take great pains in selecting and properly labelling the varieties, as we think we have one of the best fruit sections of the Dominion.

The show of horses was excellent. The cattle were a little under last year in number, owing probably to bulls being shown in the spring, but those exhibited were a very fine class, thus showing that breeders are waking up to the fact that none but first-class

animals can be sold with a profit, owing to the increased demand for foreign shipment, as only good animals are purchased for foreign trade.

Sheep and hogs were largely shown and evinced careful breeding. The show of poultry was much larger than usual, and we think that better facilities should be provided for exhibitors in this department, and would recommend the future Board to erect a suitable poultry-house for the exhibition of this important branch.

The Ladies' Department showed an improvement on former years, and would have been much larger, but owing to the wet morning of the first day a great many entries made in this class were not exhibited. * * *

Howard.

The Annual Show of the Society was held on the Society's grounds in the village of Ridgetown, on Friday and Saturday, the 1st and 2nd days of October, 1880, which was well attended.

We are happy to say the past year has been a very successful one for the farmers, and likewise for the Society. As you will see by the report, your Society has had the past year the largest number of members and the greatest number of entries it ever had. We have the past year erected a new building for roots and grain at a cost of \$175, which was found a great convenience to your Society and exhibitors, and have also paid \$75 on the land purchased from Messrs. Horton and Cunningham. The display in the Hall at your late Fair, was certainly very creditable to the Society and exhibitors, and the Board trusts that further efforts will be made the coming year to increase the number of entries and the display in the Hall.

The number of members on the Society's books has increased to 303, the number of entries taken by the Secretary was 1,267, being 163 more than any previous year since the Society was formed; the cash taken at the gate for admittance was \$261.50, and the sum of \$43 for stands on the ground; \$157.65 was received from the Legislative Grant to the Society as our share; \$50 was received from the Municipal Council of Howard, to assist in the erection of another building, and the sum of \$19.25. was received for the payment of Special Prizes, given by members of the Society; making in all the sum of \$838.40, as the total receipts of the Society for the year. * * *

KENT, WEST.

The Society held its Annual Spring Fair, for which there were twenty-five entries made, and although the number of entries did not equal those of former years, the general character of the horses shown were an improvement; and when excellence and not number is the object in view, we may safely say that the Fair was a success. The class of horses that a few years ago carried off first prizes are now deemed unworthy of exhibition, and we must congratulate the county on the very marked improvement in all our classes of horses within the past few years, and believe that money spent in prizes for thoroughly good horses will be money well spent.

Your Directors purchased in the spring, from breeders of good repute, four Durham heifers, three of which were sold at prices which reimbursed the Society for their cost. The other has recently been sold for \$60, being at a small loss. It is needless for your Directors to remind the members of the Society that a great improvement is noticeable in our stock. It is not many years since that a thoroughbred Durham was a marked feature at our exhibitions, and should the Society continue its practice of introducing first-class stock, the grade class will become a thing of the past.

For many reasons the Fall Exhibition was not equal to former years. Your Directors have had to labour under a great disadvantage, having been deprived of the barrack ground. Your Directors were obliged to divide the exhibition, and to hold the outdoor part of the fair at the Society's grounds on Murry Street, and the indoor exhibition at the Drill Shed. This division caused considerable confusion among visitors, and although

the attendance was large at both buildings and ground, the receipts did not amount to quite as much as previous years.

The entries were not quite as many as the previous year owing to the non-entry of agricultural implements. This is attributed to the offering of diplomas as prizes instead of money, and your Directors regret that their great desire to economize the Society's funds prevented a greater display of that branch of industry, which each year is becoming of greater importance to the agriculturist.

The exhibition in other respects was very good, and the attendance large. Your Directors believe it is an advantage to hold the Fall Fair earlier than has formerly been done. Our experience of the past year leads us to believe such to be the case, and we would strongly recommend a continuance of the practice. * * *

Raleigh.

In the beginning of the year your Directors imported a thoroughbred bull, which was sold to the highest bidder, realizing nearly cost, which has given good satisfaction in the neighbourhood where he was taken. We believe money is well expended in the importation of thoroughbred stock, as a good market can now be readily obtained for all good grade and thoroughbred cattle.

Your Directors have also succeeded in fencing the grounds leased from the Township. Many thanks to the members and officers who assisted in the way of work, lumber and funds in its erection, as we feel this will be a great convenience in holding our shows when pens, etc., are properly erected therein.

Your Directors held their show in the fall, but unfortunately the rain fell in torrents the night previous and until ten o'clock on the day of the show, thereby injuring it to a great extent, and rendering the grounds in a very unfit condition for driving thereon; yet we can boast of a goodly number of very fine animals shown, composed of cattle, sheep—both long and short wool, pigs of three different breeds, viz.: Berkshire, Poland China and Suffolk. Many of the above animals were prize-takers at the County Show. In horses we are far behind our neighbours. We hope to see an improvement in this class of animals.

We would like to see some of our farmers in the northern portion of the township take an interest in the Society, as many of them would be stimulated to the raising of a better class of stock, and our Society would be in a better condition financially to carry out its objects.

LAMBERTON, EAST.

In presenting you this, the Sixth Annual Report of our Society, we have pleasure in stating the show for the past season was the most successful yet held in respect of receipts, entries, and amount of prizes paid.

Great credit is due to the Watford Municipal Council and citizens for the deep interest they manifested in procuring the finest exhibition grounds west of London. The time being short, only temporary buildings could be erected; doubtless before the exhibition is again held there, we will see good, permanent ones built.

There was the greatest exhibit of agricultural implements and farm steam engines ever on any show ground west of London. One was forcibly reminded of the Western Fair. Every department was well represented—in fact, the show of sheep, horses and wagons *exceeded* that of the London Fair. Patrons of cheese factories have every reason to be satisfied with the results of the past year.

With regard to crops, fall wheat, generally speaking, was good, and fair prices were obtained. Spring crops have, however, been below the average.

Stock raising for export trade is improving, and a great number of cattle, sheep and horses have been shipped to foreign markets during the past year, with good results.

We would suggest that, in future, instead of prizes being awarded for agricultural implements, a prize—Medal or Diploma—be given for the best display only.

In looking back over last year's returns, the farmer, in particular, has great reason to thank the Giver of all good gifts for the prosperity which he enjoys.

In conclusion we give a comparative statement for the last few years, also an abstract of the receipts and disbursements for 1880.

COMPARATIVE STATEMENT.

—	1875.	1876.	1877.	1878.	1879.	1880.
Number of entries.....	1220	1621	1578	1584	1981	2137
Members.....	303	268	345	285	278	309
Gate receipts.....	\$183 00	\$137 00	\$194 00	\$188 00	\$281 00	\$324 22
Prizes awarded.....	570 00	502 00	664 00	713 00	764 00	975 79
Printing advertisements....	69 00	30 00	61 00	34 00	71 00	61 75
Postage, stationery.....	18 00	12 00	8 00	4 00	5 00	11 84
Directors, judges' expenses.	35 00	29 00	56 00	59 00	72 00	81 17
Assisting at show.....	9 00	4 00	32 00	17 00	49 00	30 00
Salaries.....	58 00	42 00	49 00	51 00	55 00	55 00

ABSTRACT STATEMENT OF RECEIPTS AND DISBURSEMENTS, AS AUDITED FOR 1880.

Receipts.

Balance from 1879.....	\$300 19
Members' subscriptions.....	309 00
Gate Receipts.....	324 22
Government grant.....	700 00
County grant.....	200 00
Received fees from ploughing match.....	11 00
	<u>\$1844 41</u>

Disbursements.

Prizes paid for 1880.....	\$840 79
Prizes paid for 1879.....	13 30
Prizes paid for ploughing match.....	135 00
Government grant, townships.....	372 57
Exhibition grounds.....	150 00
Gate and caretakers.....	26 50
Printing and advertising.....	61 75
Postage and stationery.....	11 84
Delegates to Provincial and County Council.....	14 00
Directors' and judges' expenses.....	76 17
Secretary, treasurer and auditors.....	63 50
Refunded to Warwick Township Agricultural Society.....	10 00
Directors' expenses at Forest, 1879.....	1 75
	<u>\$1777 17</u>
Balance on hand.....	<u>\$67 24</u>

LANARK, NORTH.

[LETTER OF THE SECRETARY TO THE COMMISSIONER.]

ALMONTE, 18th February, 1881.

SIR,—I herewith forward you the returns of the North Lanark Agricultural Society, together with the returns of the township societies, viz., Dalhousie, Pakenham and Lanark.

You will see that exhibitions were held in each last fall, and liberal prizes paid.

With respect to North Lanark Society I have to say we were never in so prosperous a state.

We had one of the best shows last October we ever had, both as regards the number and quality of entries and the number of visitors. At the low fee of 10 cents for admission we realized the handsome sum of \$480.

I regret, however, to say, as I did in returns of 1879, that our wheat crop was almost a failure, both in spring and fall wheat; causes just the same as in 1879. However, notwithstanding this discouragement a large breadth of fall wheat is sown, and from the appearance of it, so far as examined by some of our farmers, the prospects are good. The spring frosts, however, may militate against it. Considerable interest is being taken in the improvement of stock, as also in grains and fruit. We consider these societies a great benefit to the country.

Respectfully yours,

THOMAS COULTER,

Secretary.

Hon. The Minister of Agriculture.

LANARK, SOUTH.

In submitting the Annual Report for the past year the Directors of your Society beg leave to state:

That the annual Fall Exhibition was held on the grounds of the Society at Perth, on Thursday and Friday, October 7th and 8th, 1880. Owing to favourable weather and the increasing interest taken by the general public in the operations of your Society, the Show turned out, financially and otherwise, one of the most successful of those held under the auspices of the Society for a number of years, the entries being very numerous and the quality of the exhibits generally of a high order of excellence. The receipts at the gates were also very good, being the largest ever taken in at the present grounds (although the admission fee has been greatly reduced), and only exceeded on two occasions, at both of which times extra inducements had been offered to the general public.

It gives them much pleasure to report that the debt due Mr. John Keays has at length been completely wiped out, and the only amount due by the Society is the mortgage on its grounds, amounting to six hundred dollars, on which there are no arrears of interest due.

It affords them much gratification to state that during the past year the Society received a grant from the Town of Perth of the handsome sum of one hundred dollars in aid of its funds, being the first municipal aid received by the Society since its foundation. They trust that this action will be followed up by the adjoining municipalities and the County of Lanark, and that the Society will be thus enabled to assume the position which it ought to hold in this part of the Province. Owing to the receipt of this amount they were placed in a position to provide some shelter for stock, and accordingly erected a long row of shedding for cattle at an outlay of one hundred and fifty-one dollars. This accommodation was much appreciated, and contributed very materially to the success of the Show. Horses, sheep and swine are still without any shelter and exposed to the tender mercies of the weather, and they trust that their successors will be able to do something in this direction during the coming year.

They would strongly urge upon their successors in office the necessity of exercising strict economy in the management of its affairs, and trust that the future career of the Society may be prosperous, and its usefulness further extended and appreciated.

LEEDS NORTH AND N. GRENVILLE.

The Directors of the above Society have much pleasure in submitting the following report for the consideration and information of the members of this Society:

The accompanying financial statement of receipts and expenditures for the year now past will, we trust, be found on the whole satisfactory.

While regretting that a deeper and more general interest has not been taken in the welfare of the Society by the farmers, for whose profit such societies exist, we yet have reason to congratulate the Society on the success that has attended our efforts during the past year, and trust with the experience gained our successors in office may be able to make the ensuing fair one of greater success and satisfaction.

We would also suggest to the individual members the necessity of inducing, not only their neighbour, but their neighbour's neighbour, to join this Society. Situated as we are in the centre of the Riding, there is no reason why this should not be the most flourishing electoral district Society in Central Canada. The more members we have the larger will be the exhibit, and consequently the greater will be the success of our annual fairs.

The branch societies of Elmsley, Welford, Kitley and Oxford have sent in their reports as required by law.

MIDDLESEX, EAST.

Another year has passed since we had the honour of being elected Directors of this Society, and custom and law both require that we should give you a candid statement of our proceedings and of your affairs since we were entrusted with the care of your interests, in order that you may be able to pass an intelligent opinion on our acts, and as far as possible utilize the light of experience to guide you in the time to come.

We have again been blessed with an abundance of the products of the soil. Fall wheat has been an excellent crop, and all other crops have been a fair average, with the exception of spring wheat and peas. Spring wheat has been nearly a failure for some years past, and it is difficult to find out the reason, but we are still of opinion that a change of seed from some other climate would be most likely to prove a remedy.

Peas have been so much destroyed by bugs for some years past that the majority of the farmers in this county have quit sowing them. Your Directors sent a memorial to the Commissioner of Agriculture, the Hon. S. C. Wood, last year, and were promised that the matter should be referred to the Agricultural Commission, and we trust that the Commissioners in their report will recommend the Legislature of Ontario to provide an efficient remedy, as we are convinced that this is one of the few evils that may be cured by legislation.

The Western Fair last fall certainly exceeded our expectations in every respect. On account of the late season at which it was held, and the great number of shows that had been held previous, and especially as the Southern Counties had made extra exertions to establish their first fair, to be opened by the Marquis of Lorne at St. Thomas, we naturally feared that both exhibitors and visitors would be tired attending so many shows, and that the Western would likely suffer. But we were agreeably surprised to find that the exhibition as a whole was certainly equal, and in many departments far superior, to anything we had seen before. You will see by the Western Fair accounts that we received more from admission fees than ever before, except on one occasion, and were able, after paying everything, to lay by a considerable amount in addition to our surplus, and this too although we had no person of high rank to inaugurate our show, no balloon ascensions, races, regattas or reviews to attract and amuse the crowd.

In fact our experience seems to prove that it is the best policy to make our fairs instructive and useful, rather than attractive and ornamental. The solid yeomanry of the country then feel it to be their duty to attend an institution where business and information is the object, and pleasure only an incident of the occasion. Where it has been tried to make amusement the chief object, to the neglect of the more useful branches, people soon come to look upon it something like a circus; and a real circus can beat them on that line in spite of all they can do.

The exhibition grounds question has given us a great deal of trouble since our last annual meeting. Contrary to our expectations the vote of the citizens last spring on the by-law to sell the exhibition grounds resulted in a majority for the sale. But there was a general feeling in the city that this majority was not gained by fair means, as the votes of all those who were in favour of the exhibition being moved either east, west or north were combined against those who were in favour of retaining the present grounds; and moreover as the vote was for the sale of the whole grounds, it was seen to be impossible to carry it into effect, as no arrangement had been made with the parties holding a lien on the east part, by which they had agreed to relinquish their rights. Still a small majority of the City Council decided on selling the west part if they could not sell the whole, and had the land surveyed and advertised for sale on the 12th of October last. But in the meantime a strong feeling had been aroused in the city in opposition to the sale, and we were assured and led to believe that if the sale could be postponed and the citizens given another opportunity of voting on the question, there would be a majority of at least two to one against the sale. Taking this into consideration, and also knowing that nearly all the members of our Society were in favour of keeping the present grounds by all means if possible, we were induced to apply to the Court of Chancery for an injunction to restrain the sale. This injunction we obtained, and in consequence the land was not sold. But at the trial of the case in Toronto we lost the suit, and it was decided that the city had the power to sell the west part at any time.

This suit cost a great deal of money—\$917 in all, of which sum we paid \$480, and the balance was paid by subscriptions from the citizens. After the suit had been decided the City Council opened the streets through the grounds, but postponed the sale until another vote was taken and an arrangement made whereby the whole of the grounds could be sold if the citizens should so decide.

In pursuance of this plan a committee of the Provincial Association and a committee of the County Council offered on certain conditions to give up their rights to the present grounds and accept Salter's Grove in exchange, if there was a majority for selling the present site and moving the exhibition to Salter's Grove. Your Directors also assented to the proposed exchange, provided that it was approved by the members at a general meeting. Indeed we had little choice in the matter, as the law suit had decided that it rested entirely with the city to say whether the Western Fair should be held on the present grounds or not, and we see no reason to regret that it is so, for however much they may be divided in opinion as to the proper location for the Fair, the recent agitation has shown that the citizens are quite as unanimous in favour of the continuance of the exhibition and as anxious for its prosperity as we can be. And besides as the ratepayers of London have engaged to find the money to erect the buildings and provide the grounds, it is only reasonable that they should have the choice of laying it out where they believe it will be of the greatest advantage.

At the elections this month in the city, the question was submitted to the people whether the exhibition should be held in the present grounds or in Salter's Grove, and the vote resulted in a majority of 95 for retaining the present grounds. We feel sorry that the majority was not very much larger. One way or the other it would have had a much better chance of being finally settled, and no doubt would have been much better for the Fair if the citizens had not been so equally divided. We fear that the Aldermen will be reluctant to take any irrevocable steps in opposition to nearly one-half of the ratepayers.

We hold the price of the land we sold on Talbot Street (\$5,000), and our rights to the easterly part of the exhibition grounds still intact and unimpaired. We believe it to be the duty of your Directors to use this money and these rights in the way best calculated

to secure the permanence and prosperity of our annual exhibitions; but we would again reaffirm the standing resolution that this money should not be spent nor any important resolution with regard to the exhibition grounds adopted, without first obtaining the sanction of the members at a general meeting.

In conclusion we would make honourable mention of the Directors of the City Society. They have had some excellent members on the Board last year, and we would cordially thank them for their active and untiring exertions to promote the success of the Fair. For ourselves, we may have erred in judgment in some cases, but we think we may fairly claim that we have spared neither time or trouble in doing our best to make the Western Fair what we believe it has been and what we hope it will long continue to be—the best managed Fair in the Province.

MIDDLESEX, WEST.

The President, Vice-President and Directors of the West Middlesex Electoral Division Agricultural Society in presenting their Annual Report for 1880 have the honour to submit as follows:—

1st. Herewith are submitted, with a recommendation for adoption, the names of 214 members of the Society at \$1 each, and 20 lady members at 25 cents each, also the Treasurer's statement of receipts and disbursements duly audited, showing the total receipts, \$1,337.85; and disbursements, \$1,313.59; leaving a balance in the Treasurer's hands of \$24.26.

2nd. The spring show of stallions was held on April 28th, and was very satisfactory, the entries being in excess of former years, with a fair attendance of visitors. We would recommend it to be continued. The Fall Show was not so good as in former years; the entries were not so many as in 1870; the weather was very favourable and attendance good. The number of entries was 1,445; the gate receipts, \$285.73; the amount of prizes awarded was \$618.30, of which \$574.35 have been paid. We would call attention to the offer by Cameron & Son, Strathroy, of a prize of \$5, for the best two bushels of the new Democratic wheat. The prize was not awarded but stands good until taken. The principal decrease of entries was in fruit, and the show was materially affected by the shows at Ailsa Craig and Elderton being held on the same day.

3rd. Directors would submit the following as an approximate estimate of the principal crops:—Fall wheat, 20 bushels per acre; spring wheat, a failure; oats, 35 bushels per acre; peas, a failure, very few sown; corn, 50 bushels, shelled, per acre; potatoes, 100 bushels per acre; turnips, 400 bushels per acre; mangolds, 500 bushels per acre; carrots, 400 bushels per acre; hay, 1½ tons per acre; fruit was generally a good crop, especially apples.

4th. We have to notice the early and sudden commencement of winter which set in with severe frosts, and as preparations had not been completed for taking care of roots, etc., no doubt some losses occurred on that account, but on the whole we have much to thank the Giver of all things for. Your Directors recommend that the horse ring be removed farther south and enlarged to enable roadsters and carriage horses to show their speed. We would farther recommend that it be made imperative, instead of optional, that winners of prizes leave their membership fee for the ensuing year.

5th. Finally, as the general feeling seems to show a wish to improve the Fall Show, we trust that a determined and hearty co-operation with the new Board of Directors will result with a marked improvement and restore the Society to its former good position.

* * *

Strathroy Horticultural Society.

The President, Vice-President and Directors of the Strathroy Horticultural Society in making their fourth Annual Report beg leave to submit as follows:—

It is with great pleasure we submit our report of the fourth year of our existence, because it speaks only of progress in the study in which we are so much interested, and of prosperity in all the undertakings of the Society.

Your Directors deemed it best to hold only one exhibition, which on mature consideration of the Board, was resolved to be a midsummer one, and which was held in the new Skating Rink on the 31st of August and the 1st, 2nd and 3rd days of September, and your Directors have the satisfaction of being able to state that a large measure of success has attended their efforts on behalf of the Society, and they feel that they have to congratulate the members on the improved condition of the Society as compared with previous years.

We think it especially gratifying that our Society not only continues to hold its own, but that it has increased in interest to the public; especially to those interested in the culture of fruits, vegetables, plants and flowers. As the future of our country is so bound up in our horticultural and agricultural interests, it cannot be too strongly urged the necessity of members taking a more active part in coming exhibitions and to aid in carrying on the work which has so efficiently been begun by the Society, from the fact that its efforts have been crowned with success, which its most enthusiastic members did not at first expect.

The various contributors deserve great credit for the manner in which they brought forward their splendid plants and lovely flowers, among which many new and interesting specimens were shown in fine condition, and displaying them in miniature gardens laid out with sod, bordered walks, etc., lent enchantment to the view, presenting all the elements of beauty to the sight, while from among the foliage, the sweet melody of the song birds charmed the ear, the whole being like the realization of a fairy dream.

The display of fruit was truly splendid, especially the peaches and plums, which have seldom been so largely shown or of such excellent quality. The same may be said of grapes, as owing to the very favourable season for this variety of fruit, a very large number of collections were entered for competition. Apples were also numerous, and many first-class specimens were exhibited. The show of roots was also very fine, and would have done credit to any exhibition in Ontario.

Your Directors cannot conclude this report without acknowledging the goodness of an all wise Providence for the abundant blessings vouchsafed to us during the past year, and while the Lord does not forsake but provides for those under His care, may we, His dependent creatures be ever ready to ascribe to His Name all honour, glory and dominion.

MUSKOKA.

The number of members was 115, an increase of two over the number of the preceding year, and the amount subscribed by them was \$117.50.

The following are statistics relating to the last Fall Show, Sept., 1880: The receipts at the show ground gate amounted to \$52.16, being a decrease of \$21.63 on what was received in 1879, but the falling off is easily accounted for by the unfortunate weather which occurred, and the almost impassable condition of the roads.

There were 384 prizes offered, amounting in value to \$524.50, being in number 16 and in amount \$22 more than in 1879.

The division of the prizes offered was as follows: For horses, 32 prizes; cattle, 61; sheep, 48; pigs, 18; poultry, 22; produce, 106; manufactures, 33; and ladies' work, 64. There were three special prizes offered.

The amounts of the prizes offered in each class were: For horses, \$71; cattle, \$113.50; sheep, \$84; pigs, \$31; poultry, \$14.50; produce, \$112.50; manufactures, \$41.50; and ladies' work, \$56.50.

The number of entries was 628, being 58 less than in 1879. Of these 57 were for horses, 41 for cattle, 69 for sheep, 23 for pigs, 13 for poultry, 312 for produce, 21 for manufactures, and 92 for ladies' work.

Comparing these figures with the corresponding ones of the preceding year, we find the difference in numbers of the entries in the several classes are as follows: A decrease in horses of 11, cattle 8, poultry 8, manufactures 10, and ladies' work 52; and an increase in sheep of 18, pigs 9, and produce 4.

The value of the prizes awarded to successful competitors was \$317, apportioned as follows: Horses, \$48.50; cattle, \$30; sheep, \$57; pigs, \$18; poultry, \$5.75; produce, \$102; manufactures, \$15.50; and ladies' work, \$40.25. Total, \$317.

It was much to be regretted that the condition of the roads made it difficult, and in some cases impossible, for members residing at a distance to bring in live stock, and the falling off in numbers of cattle exhibited was visible, and detracted much from the appearance of the show. In the ladies' work department, also, there was a decided difference from the display of the previous year, although the amount of prize money offered at last show was greater.

It is almost an established fact that the railroad will either be constructed right across the middle of the show ground, or at all events cut a portion off it. In either case we believe that it will render it useless as a show ground, and that a new one will have to be procured. This will, of course, be a matter for the serious consideration of the in-coming Directors. * * *

We regret to inform you that the building on the show ground has broken down. This occurred on the 5th of this month.

The Medora and Wood Township Society has collapsed, and its Treasurer has placed the funds in hand of the Society in our Treasurer's hands, to be kept until the Society be revived, and at present there are eight Township Societies who receive a portion of the Legislative grant through this Society, namely, McKellar (union), McDougall, etc., Humphrey and Cardwell, Stephenson, Morrison and Ryde, Watt, Foley, and McLean and Ridout. As far as can be seen from the accounts of the Township Societies, they appear to be in a flourishing state. * * *

NIAGARA, E. D.

The returning seasons have brought around that period when the law requires that the Directors of your Society should render an account of the powers committed to them at your last annual meeting. In doing so your Directors cannot but congratulate the Society upon its exhibition, which was held, as usual, in the Town of Niagara, and are under many obligations to the corporation of that town for furnishing the Society with the necessary accommodations for holding our show. The stock on exhibition at the Fall Show would have done honour to any county in this section of country. The grain and seeds were fully up to previous years' exhibitions, as were also the field roots and vegetables. Fruits of all kinds, except peaches, were well represented, and the quality very fine, the show being held rather late in the season to give a fair representation of our peaches. These, however, were on exhibition at our wharfs from the 20th July until the boats stopped running. One new industry was represented which we hail with much satisfaction, namely, a sample of evaporated fruit by Mr. Nelson Young, of Virgil. We hope that Mr. Young, or some other parties, may see their way clear to going more extensively into this business, as there is a good opening for it in this section. The growing of peaches is yearly extending, and rapidly attaining to be one of our largest exports. We hope your Society will see it their duty to use every means in their power to prevent the spread of the "yellows" among our peach orchards, it being already in our midst, though fortunately as yet confined to our small gardens; and as it is only by the prompt destruction of all the trees affected, together with the next adjoining ones, that the evil can be stamped out, we hope all interested will unite their energies toward so desirable an end. Your Committee would earnestly recommend that all the members of your Society, and all others interested in this branch of fruit culture, should be very careful in buying trees, and not procure them from any affected district. We have also to congratulate your Society that at least one of its members received the Silver Medal awarded by the Agriculture and Arts Association of Ontario, for the third best cultivated farm in the whole group of counties entered for competition.

NORFOLK, NORTH.

The Directors, in presenting their report for the past year, are gratified in announcing a still greater improvement in the Exhibition. A deeper interest taken by the community, a yet larger increase in the membership, together with the favourable weather, all resulted in making the Exhibition the best ever held in the county.

The Treasurer's statement showed a balance on hand of \$404.81 with which to begin the year's transactions. As there had been no repairs on the grounds for some time, it became necessary to do something, as the fences, etc., were in a very bad state. The necessary repairs, together with the building of the Secretary's office, the putting in new posts and new poles for proper tying of cattle (all being in the way of permanent improvements), amounted to about \$300. The expenses of show, printing, salaries, General Superintendent, and other accounts, foot up about \$250, and we also paid in premiums \$1,028.70, an increase of nearly \$300 over the previous year. Still, with all this large increase in expenditure, your Directors now congratulate the Society that they were enabled to carry on the show so successfully and make such a fine exhibit for the year, being able to show at the end of the year's transactions the handsome sum of \$578.62 to the credit of the Society. After paying balance due South Riding Society at the beginning of the year, viz., \$38.04, and deducting the balance of \$6.45 due the South Riding, we still have \$562.37 on hand. Your Directors hope that this statement may receive the hearty approval of the members of this Society.

The Spring Show was held, as formerly, on the Society's grounds. The show of horses was still an improvement on former years, especially in the general purpose and roadster classes. In bulls the show was deficient; but we are pleased to note that during the year there have been several purchases by our agriculturists, which we hope will prove beneficial to such parties, and thus show to exhibitors and others that it is profitable to raise thoroughbred stock.

The Fall Show was held on the 14th and 15th October, and was entirely successful in every respect. The gate receipts, although not as large as last year, still reached the satisfactory sum of \$865, being a decrease of \$107.87; but this decrease may be accounted for in part by an increased membership of about fifty in both Ridings, the tendency of an increase in membership being to reduce the gate receipts. The membership of this Riding last year was 214 as against 182 the former year—an increase of 32, and a gain of \$35.50. The entries were largely in excess of the former year, reaching the large number of 2,970, being an increase of 600 entries.

The horse ring still continues to be the most attractive feature of the show, and this year's exhibit, as remarked by very many persons, was in advance of either Hamilton, London or St. Thomas. The exhibit in cattle was not as good as last year, but, as before stated, we hope to see a better display in future. In sheep and pigs the improvement is very marked. Poultry still remains a very attractive feature of the show, and we would recommend increased accommodation for the same. Grain, seeds, roots and vegetables, as usual, were A No. 1. The horticultural display was most magnificent. The dairy department was more interesting than usual, there being no less than nine special prizes offered in that department. In agricultural implements the interest still keeps up; but your Directors are sorry to see that the implement manufacturers, at their last meeting, decided not to exhibit at any shows, with the exception of the Provincial, Toronto Industrial and Dominion. The display of carriages was very good, but the exhibits would be increased if proper accommodation were provided. In fine arts, domestic manufactures and ladies' work, the increase in entries fully show that the ladies are able and willing to do their share in making the Exhibitions more interesting and successful. Much credit is also due to the merchants and business men of Simcoe and other places in the county for the very active interest taken by them in the Exhibition.

Your Directors feel that in erecting the Secretary's office and the building of the sidewalk and approaches for the accommodation of foot passengers, they have added greatly to the appearance of the grounds and also to the comfort and convenience of all concerned. Your Directors, according to request, appointed a General Superintendent for

the year, and find that it has been a very great benefit to the Society. Mr. Oliver Austin was appointed to that position, and by his good judgment, courteous and obliging manner, proved himself the right man in the right place. Your Directors would recommend the erection of a new dining hall, the one now in use not being worthy of the Society, and altogether unfit for the purpose.

A new feature in this year's transaction was competing for the Gold, Silver and Bronze Medals, presented by the Provincial Association for the best managed farms in each Riding of the thirteen counties comprised in District No. 1. As the County of Norfolk was embraced in this district the necessary entries were made, resulting in the Gold Medal being awarded to J. B. Carpenter, Esq., of North Norfolk, and a Bronze Medal to Richard Trinder, Esq., of South Norfolk. Your Directors would here suggest that, as in the course of a few years a like opportunity will offer, there may be others found in this Riding not only willing but perfectly prepared then to enter their farms for competition, and that the results may be alike satisfactory and honourable to the County of glorious old Norfolk.

Your Directors in resigning their trust into your hands, have very great satisfaction in knowing that their efforts were crowned with success, and hope their successors may meet with still greater encouragement, and that a new inspiration may be given to the Society by fresh accessions to its membership and an enlarged interest in its workings on the part of the whole community.

Simcoe Horticultural Society.

The Directors for the past year, having now completed their term of office, beg to submit the following report :—

While regretting that the Spring Exhibition, owing to want of entries, had to be abandoned on the morning of the day appointed for it to be held, we have the satisfaction of knowing that the failure of this exhibition assisted very materially in placing the Society on a sound financial basis again, as in consequence of the failure we have been enabled to save the prize money offered at that time.

The Fall Exhibition was very fair. The exhibition in the fruit department sustained well the reputation of "Glorious Old Norfolk," as being one of the best fruit-growing counties in the Province. In vegetables and flowers the entries were smaller than usual, and were not up to the excellence of those shown at former exhibitions.

The question of keeping up the Society has been under consideration, and we have decided to leave the matter in the hands of the members, and trust that they will take into consideration the good the Society has done in the past, before making up their minds to let the Society drop. * * *

NORTHUMBERLAND, EAST.

The President and Directors in submitting their annual report to the members of this Society cannot omit remarking with pleasure that under the peculiarities of the season the crops were with few exceptions good. The wheat crop, being the most noticeable, was nearly or quite a failure, both fall and spring, and this cereal being a staple commodity was keenly felt by the husbandmen universally.

The Annual Show of this Society was held on the Joint Stock Company's grounds in the village of Brighton, on Thursday and Friday, 7th and 8th October last, and the Directors congratulate themselves upon the success attending their efforts on that occasion. The show of horses on the ground was very respectable, both as to quantity and quality. The cattle was somewhat deficient in numbers, but to make up for the deficiency some splendid specimens of thoroughbreds were shown.

The show of sheep and pigs was also limited, nevertheless some fine animals were on exhibition. In poultry some good birds were noticable. Roots were as numerous as usual, exceedingly large and of good quality, as were also garden vegetables.

The show of fruits was extensive and very superior in quality, especially in almost every variety of apples and pears. This portion of the Exhibition alone was worthy of the fullest consideration, and we are glad to say that there is an abundance of first-class fruits now growing in this Riding.

In dairy produce, domestic manufacture, farm implements and manufactures, there was a good display. The carriages and sleighs were in advance of any former occasion.

The ladies' department, though last, yet not least, which invariably adds so much to the pleasure and display of these exhibitions, was a grand success, reflecting favourably on the industry and good taste of the ladies in this Electoral Division.

In conclusion, your Directors would strongly recommend that more attention be given to raising of good-bred stock, as such stock will always command high prices in market.

Cramahe.

Your Directors, in presenting their report for the year just past, desire to express their gratitude to a bountiful Providence for the blessings of the year.

The Annual Exhibition of your Society was held in Colborne, on Friday, Oct. 15th.

The display of stock was, taken on the whole, fully equal to former exhibitions, while the driving horses were superior to any show held in the township for years.

In grain the display was good. This part of the country being very well adapted for the growth of a superior quality of barley, there was a large number of acres sown of this cereal, which yielded well and sold at remunerative prices. The wheat crop was a poor one, yielding in a number of instances from only three to five bushels per acre.

The root crop, owing to the dry weather in the latter part of the summer, was rather light, although there were some good specimens on exhibition.

The display of fruit was as usual a very creditable one.

The mechanics' work was about as usual, only a small exhibit.

The ladies' work did not equal in quantity some previous shows, but we believe the quality was not inferior to any.

Owing no doubt to a greater number of side shows and other attractions, the attendance in the hall was not equal to some former exhibitions.

Your Directors are sorry that they have to report a balance due the Treasurer this year, the first for a number of years; but they hope that instead of being discouraged that the Society will make greater advancement than ever.

Percy.

Your Directors beg leave to report as follows:—

That they have great pleasure in being able to report a steady progress in said Society. The Annual Show was held in the village of Warkworth, on the 13th and 14th days of October, 1880, and was the best and most successful show ever held by this Society, and was numerously attended by the inhabitants of this and the surrounding townships. The receipts at the gates during the show amounted to \$181, at 10c. each. The entries were largely increased over former years, being about one thousand entries, which made the show a complete success.

The show of horses, cattle, sheep, pigs and poultry was large, with fine specimens; the judges finding it quite difficult in deciding in many cases—a proof of the determination of the farmers trying to excel each other in the improvement of thoroughbred stock in this and the adjoining townships, in which Durham and Ayrshire are the most numerous. In sheep the specimens were very fine, and a large number of well-bred Leicester and Cotswold were on exhibition. The Southdowns and Merinos have nearly dwindled to 0 in this township. The show of pigs was rather below the average this year, but some fine animals were exhibited.

The grain department was both extensive and superior in quality, sustaining the high character this township ever holds in its good quality of grain and seeds. Although there was a great deficiency in the wheat crop, both fall and spring, yet very fine samples were exhibited. Your Directors congratulate the farmers on the large and abun-

dant yield of rye, barley, oats, peas and Indian corn, which largely assisted in making up the deficiency in the wheat crops.

In roots the exhibition was large and extensive; beets, mangolds, carrots, turnips, and potatoes being mammoth in proportion, and certainly the best specimens we have yet seen exhibited by this Society.

The fruit show was also large and extensive; and as the fruit this season was really above the average in quality and quantity, the show in this department exceeded any former year.

There was quite an exhibition of agricultural implements on the ground, and the display was sufficient to guarantee the fact that the mechanical genius of our county was onward and progressive.

There was a good display of domestic manufacture, both useful and ornamental.

The ladies' work deserves more than special notice. No class of exhibitors was more deserving of praise than this one, and the display of fine work, painting, and useful and ornamental needlework was really such as reflected great credit upon them.

In conclusion your Directors hope you will not consider it a great presumption on their part to offer a few words of advice in regard to the management of farms. Do not attempt to put more land under crops than can be well and properly managed, for we believe that it is a well-understood fact that five acres properly tilled and managed will produce more than ten acres badly attended to, and if we are desirous of increasing our annual average crop we must put this into practice. The remaining portions of our land would be much more profitably employed by being seeded to grass as pasture and hay for our stock, which, with our increased growth of roots, would tend largely to their comfort and our profit by producing a much better class of manure.

NORTHUMBERLAND, WEST.

In presenting our Annual Report, we have much pleasure in being able to congratulate you on the prosperous position of this Society the past year. The total number of members is 188, and the entries compared with the preceding year are about equal, but we are sorry to have to report the number of exhibits were less this year. One reason, and perhaps the principal one, is that, grain, fruit, roots and vegetables, being much better in quality this year, each one seemed to have the impression that there would be better samples on exhibition, neglected to bring what they had entered, causing a deficiency in the above named classes. The other classes were well represented.

Your Directors after due consideration thought it advisable to hold a show of stallions last spring, which was finally held on the 28th of April, when some splendid horses were exhibited in the following classes, viz., blood, heavy draught, agricultural and carriage horses.

Financially the exhibition held in October last was not so successful as the preceding year, there being not so numerous an attendance, and this we think can be fully accounted for by there being so many exhibitions in such close proximity to our own, and all preceding it; but from the number of members belonging to the Society, and the general interest manifested, we feel justified in saying the Society is in a prosperous position at the present time.

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Haldimand.

Your Directors, in presenting their Annual Report, take pleasure in stating that the finances of the Society are in a favourable position. The Treasurer's report, which will be laid before you, shows a balance on hand, from all sources, of \$163.49. At the January meeting of the Directors it was decided to hold the usual Fair this year. Your Directors have much pleasure in stating that the Annual Fair was very good; the stock was rather above the average of previous years, and the grain, seeds and roots were up to usual quality exhibited.

Hamilton.

Your Directors in presenting their report are pleased to state that your Society is in a healthy condition. There are ninety-seven members, being an increase of three on last year, and doubtless there would have been a larger increase had not the County Society kept back one dollar from each exhibitor that took prizes to that amount, and thereby making them county members, and consequently they are lost to the Township Society. Your Directors resolved at their first meeting to unite with the County Society for the purpose of holding a union exhibition, and with a view to that appointed the whole Board a committee to attend the first meeting of the Directors of the County Society to arrange terms of union, which were satisfactorily accomplished.

As you are aware the show, which was held on the 19th and 20th of October, was quite a success, the only drawback being the cold, unfavourable weather, which caused a falling off in the number of visitors, and consequently a smaller amount was taken at the gate than on the previous year.

Your Directors also decided to continue the prizes for field roots, and to charge a fee of twenty-five cents for each entry as was done last year, and notwithstanding the entrance fee there was quite a competition, there being ten entries in turnips, seven in mangolds, and nine in carrots, making in all twenty-six. The awards of the judges were as follows: For turnips, 1st, Jas. Thompson; 2nd, Jas. Davidson; 3rd, Jno. Bowman; 4th, J. & R. Westington. For mangolds, 1st, Geo. Wicks; 2nd, Robert Scarf; 3rd, Jno. Pratt; 4th, Peter Tennant. For carrots, 1st, Jno. Bowman; 2nd, Jas. Davidson; 3rd, Daniel Baker; 4th, J. & R. Westington. The prizes were \$4, \$3, \$2 and \$1, respectively, for each kind of roots, making in all \$30.

The root crop, especially turnips, was considerably injured by the dry, hot weather. Wheat was in many instances almost a total failure, and on the whole much below the average. Most other crops were good, and the prices realized for most farm products have been pretty satisfactory, so that on the whole times are slowly improving, and the prospects for the farmer are more encouraging than for some years past. In conclusion your Directors would urge upon their successors in office to do their best to maintain the usefulness and prosperity of your Society.

OXFORD, NORTH.

The Directors beg respectfully to submit the following as their report for 1880:—

In conducting the operations of the Society during the past year they were actuated by an earnest desire to make it more and more a power for good to the county. With this object in view they have held under its auspices three Fairs and a Ploughing Match.

The Seed Grain Fair was held on the 17th March. There can be no doubt that the dissemination of pure and clean seed grain is of great importance, and that the furtherance of this object lies within the sphere of an Agricultural Society. The Directors are pleased in being able to report that the Seed Grain Fair to a considerable extent served this purpose. The samples were of excellent quality, and the competition for their purchase spirited. The sum of \$39 was paid for prizes to the exhibitors of the best samples. The Directors are of opinion, that by holding the Seed Fair earlier, say in the month of February, more good would be accomplished.

The Stallion Fair was held on the 14th April, at which liberal prizes were offered for thoroughbred, carriage, heavy draught, and general purpose horses. There was an excellent exhibit in all the classes, and the farmers and stock breeders were out in great force. The sum of \$100 was offered in premiums, of which sum \$95 was awarded.

The Autumn Exhibition was held on the 22nd and 23rd September. It was in many respects a decided success. There were considerably over 2,000 entries. For every entry in horses, cattle, sheep, etc., there was a corresponding exhibit, but this was not the case in fruits, vegetables, etc.; hence, the out-door exhibition was by far the best. In the opinion of not a few it surpassed all previous exhibitions held here. The turn-out of spectators was very large, and the great interest they took in the exhibition was

pleasant to witness. Large, however, as the attendance was, it would no doubt been greater but for the fact that Stratford, Brantford and Blenheim Shows were held on the same days. Your Directors lamented this collision very much, but owing to the Toronto, Hamilton and London Exhibitions monopolizing so much of the month of September and the earlier part of October, it could not well be avoided. In the prize list the Directors took occasion to thank the donors of the special subscriptions and special prizes. In this report they would again do so, and would further say, that to their liberal aid the magnificent display of horses and cattle, which was the grand feature of this year's exhibition, was very much due. The prizes in these two classes amounted to \$760, of which sum \$231 was specially subscribed. The Directors would earnestly solicit a continuance of this generous support. The fact is, if we are as a Society to advance, or even maintain the position we have now reached, it is imperatively necessary to keep up the value of the prizes. It is probable, therefore, that our successors in office will again appeal to the business men of Woodstock. We bespeak for them a ready and liberal response. Before closing our reference to the Fall Show, the Directors feel called on to notice the meagre exhibition of articles in miscellaneous manufactures. They regret they cannot argue for a larger display on the ground of the value of the prizes, but they would respectfully suggest that the wide publicity it would give to the beauty and excellence of the wares is worth something, besides the attractiveness of the exhibition would be greatly increased thereby. The incompetence of the judges is occasionally argued as a reason for non-exhibition. To this we answer, that it is very difficult to secure experts as judges in every article of manufacture, but no doubt the Directors will do all they can to lessen or remove this ground of complaint.

The Ploughing Match was held on the 15th October, at the farm of R. H. Burtch, Esq. This was a new development in the operations of the Society, and was entered on chiefly at the instance of the Blandford Society, with which for several years we have had harmonious and beneficial co-operation for exhibition purposes. The match was quite a success. The prize list, including the value of agricultural implements, etc., amounted to \$96, all of which was specially subscribed.

In conclusion the Directors have to report that the amount expended in cash prizes was \$1,362.50, and that the money value of special prizes was \$71.75, making a total of prizes awarded of \$1,434.25; a much larger sum than on any previous year. And they would further add, that the debt incurred by the purchase of the fair ground is now reduced to \$200. Everything considered, the Society may be pronounced to be in a prosperous condition. We hope it will continue its onward and upward march, and that it will become more and more a means of agricultural improvement.

Blenheim.

In presenting you with the 27th Annual Report of our Society, we beg leave to state that the financial department is still improving. Last year we were in debt to our Treasurer, and this present year shows a balance on hand of \$30. We have paid off about all the dividend due by the Society, all the loans are also paid, and our buildings are now free from debt. We have also made large improvements in the ground this year, all of which are paid for, one noticeable feature of which is the fence around the horse-ring. We have about \$50 of unpaid prizes of 1880, being some \$20 less than last year at December 31st.

Our Spring Fair was a fair average when compared with former years. The Fall Exhibition was as usual a successful one, and would compare favourably with many of the County Shows. Where all the exhibits were so good, it would be invidious to particularize; hence we will pass on to notice the Society's excursion to Toronto, on the Credit Valley Railway. This you will observe by the Treasurer's report was a success financially, and those who went on the excursion had a very enjoyable time. We would recommend the Society to arrange with some one of the Railway Companies, and each year have a farmers' excursion.

We had very favourable weather for our Ploughing Match, but owing to the root harvest being on, it was poorly attended. As good ploughing is one of the main arts for

successful farming, we would suggest to the agriculturists generally, that they take more interest in the future in this branch than they have in the past. We observe with pleasure the great interest farmers are taking in fattening of stock. The exporting of fat cattle and sheep to the old country markets has assumed very large proportions, and is engaging the attention of many of our best farmers. Their experience in this line has developed the fact, that whilst they are making the business remunerative, they are at the same time improving their lands. We would suggest that farmers pay a good deal of attention to the selection of their stock, as a great deal depends on the breed. We have always found the Durhams to rank foremost for exportation purposes. We would also suggest to our farmers that they pay more attention to fruits, especially to apples and pears, as we observe that the Canadian apples now rank "Excelsior" in every market where they have been introduced.

Zorra, East.

Your Directors for the past year are enabled to present you with a favourable balance sheet, and retire from their duties leaving the Society free from debt or embarrassment. The Union Exhibition of 1880 was not inferior on the whole to any of its predecessors; still we feel that we should not be satisfied with a stationary existence, something should be done to extend its benefits and increase its usefulness. If a Society does not add to its membership annually, there must be something wrong in its management, or it cannot be based on correct principles.

We regret to see such apathy among farmers in regard to agricultural associations. Our own township could make a very creditable exhibition with one-tenth of its farmers as exhibitors; but we have scarcely one-twentieth who take an interest in the Society. It is for you to say to-day what efforts shall be made to increase our membership and make the Society more interesting.

P E E L.

The Directors of the County of Peel Agricultural Society, in presenting their report for the year 1880, would congratulate the members of the Society and the community generally, on the indications around us of returning prosperity to our country.

The crops having been fully up to the average, and the prices ruling during the latter part of the year being remunerative, most of the farming community find themselves in a more prosperous condition than they did a year ago.

The Spring Fair was held, as usual, in April. The exhibition of stock was up to that of former years.

The Fall Fair was held, as usual, during the first week of October. The attendance was fair, but not such as to increase our finances.

That the attendance would have been larger if the Toronto Industrial Exhibition and Provincial Exhibition had not been attracting the attention of the public, covering as they did the whole month of September.

That the Toronto Industrial Exhibition affects our Fair, and will continue to do so, there can be no doubt.

The exhibition of our stock at the Fall Fair was equal to any we have had.

The exhibition of grain and roots was larger than in former years, and the show of dairy produce, especially butter, was large and of first-class quality.

The exhibition of flowers and fruit was also large and attractive.

The number of entries this year was about the same as last year, about 2,940, but owing to unfavourable weather during the first day all the articles were not brought on the ground.

The amount of prize money awarded amounts to \$1,972; last year \$1,954.

The amount of gate money, which more than anything else affects our finances, was \$1,155.63; last year it was \$1,325.

Your Directors would call the attention of members to the prizes offered by K. Chisholm, Esq., for the best plan of "Farm-house, outbuildings and grounds," the

amounts for which are \$75, \$50 and \$25, for the first, second and third best respectively, and trust that there will be considerable competition, the object being to cultivate a taste for ornamenting farm-houses, and making them more pleasant and attractive.

Your Board also, at the request of a large number of farmers and others, have taken steps to have a monthly fair established in Brampton, which has been so far a success, and we trust during the incoming year it will be still more a success.

Your Directors would urge upon the farmers of Peel, in view of the necessity of increasing the fertility of the soil, and also the strong probability of a very large demand for cattle for foreign markets, to turn their attention more to the cultivation of such crops as will be adapted for stock farming, and also to the improvement of stock suitable for the English and other foreign markets.

PETERBOROUGH, EAST.

In the spring your Society, conjointly with the West Riding, held in Peterborough a show of stallions and bulls, requiring as a condition that the horse to which first premium should be awarded stand in Norwood one day in each week during the season. The owner of the prize taker not fulfilling the conditions, the money awarded has of course been withheld. \$46.15 was your Society's share of the premiums and expenses of the exhibition.

Mr. F. Birdsall, with his co-delegates of Agricultural Division No. 5, elected Mr. John Carnegie, of Peterborough, as its representative in the Council of the Agricultural and Arts Association.

Your Delegates, Mr. Pearce and Mr. O'Reilly, attended the annual meeting of the Agricultural and Arts Association, held in Hamilton during the Provincial Exhibition week.

Mr. Roxburgh represented you in the Committee of the Central Fair, was present at two of its meetings, and as one of the Executive assisted in carrying out the arrangements for the Fair at Port Hope.

The Central was not financially successful, and your Directors had to pay over the whole amount of the guarantee appropriation of \$50 made at the last annual meeting.

The annual Exhibition of your own Society was held at Warsaw on the 14th and 15th days of October. With the weather all that could be desired, the crowd attracted to the village was, as usual, large. The entries numbered 940, being about 150 fewer than the previous year. The exhibition was quite equal to any of its predecessors, but we regret to say financially a failure. The result is almost entirely due to the want of enclosed grounds in which the horses can be exhibited. The village street having to serve for a horse ring, the work of the judges was both unpleasant and unsatisfactory. From the necessities of the case, the exhibition of horses was free to spectators, and being one of the chief attractions of the Fair, the crowd to a large extent was drawn away from the cattle grounds and agricultural shed; and as a consequence the receipts for admission to these suffered materially. The receipts at the gates amounted to \$88.32, as against \$246 the preceding year.

It is gratifying to your Directors to be able to report indications of returning prosperity throughout the Dominion. In commerce and manufactures more confidence exists. Lumbermen, with an active demand and advancing prices, are extending their operations, and our farmers with ample reason can also speak of better times.

The product of our cheese dairies during the past season has been largely increased, and the prices obtained have been highly satisfactory.

The raising and exporting of cattle has assumed proportions we scarcely realize. In the year ending December, 48,450 cattle and 31,543 sheep were exported from the Dominion. In 1879 the figures were 26,176 cattle and 78,780 sheep, whilst in 1878 there were only 18,665 cattle and 41,250 sheep. It is important to note that these were all Canadian bred, not a single head having been imported from the United States. The rapid growth thus revealed, with indications pointing to even greater demand for Canadian

cattle during coming years, ought to be an incentive sufficient to enlist greater attention to stock raising and to improvement in breeding than it has hitherto received amongst us.

We are pleased to notice a steady progress in the improved cultivation and preparation of the seed bed, and a gradual awakening to the importance of the use of fertilizers, and in this connection we cannot too strongly commend the more liberal use of salt sown broadcast, its direct effect of stiffening the stalk and increasing the yield having been satisfactorily demonstrated by some of our members.

Whilst we regret having to report an almost total failure of the fall wheat crop, and a very light yield of spring, it is satisfactory to know that a fair crop and increased acreage of barley, combined with more than an average crop of peas and oats, for which a steady market and good prices were obtained, has done much to counterbalance the deficiency in the first named cereals, and we believe that taking everything into account, the net revenue of the farm has been greater than for many years previous.

Your retiring Board would call the attention of their successors to the necessity that exists for the devising of some means whereby the membership of the Society can be increased, and at least kept up to the minimum number of 80, required for our existence as a Society under the statute. We think that if Directors and members would personally and at every opportunity advocate its claims for support, and use a little effort in their own neighbourhoods to obtain subscriptions, the comparatively small number named would not only be maintained but be very largely increased.

Without giving an opinion, your Directors venture to submit the suggestion, believing it to be at least worthy of consideration, as to whether an effort should not be made to induce the Township Societies, at least those in the front of the Riding, to give up their annual fairs, their usefulness being now questionable, and unite their funds—or so much thereof as might be fixed by mutual arrangement—with the funds of the Riding Society proper, provision at the same time being made for their representation on the Board expending the monies, and hold only one exhibition within the Riding at such place or places as might be agreed upon by the Societies interested by their representatives.

Your Directors regret to say that the Treasurer's statement shows a deficit of \$46.15, after all known liabilities have been paid.

PRESCOTT.

The President and Directors of the Electoral Division of the County of Prescott Agricultural Society beg to report to the Annual General Meeting of members as follows:

That the Society, for the year 1880, numbered 83 members, whose subscriptions amounted to \$83.

The Society for the past year offered in premiums for competition the sum of \$388, and of that amount paid to competitors \$337.50, leaving \$50.50 of said amount uncompleted for; and, after paying off all debts, find that there is \$31.42 due the Treasurer.

Your Directors also beg to report the following Branch Societies as having furnished their Annual Reports for the past year, and have also reported their list of Officers appointed at their annual meetings for the year 1881, viz., Longueuil, and East and West Hawkesbury.

This Society has no premium list to report, having handed over its funds to the County Society for the purpose of paying off the debt still existing—or that did exist at that time, but now paid off—on the Exhibition grounds and buildings at Vankleek Hill. The Society numbers 50 members.

Your Directors desire to congratulate the meeting on the fact that the cloud which overshadowed the Society for a number of years, in the shape of mortgage, has been dispersed, the same having been paid off and fully discharged, and would also take the liberty, in the name of this meeting, of expressing grateful thanks to the County Council of the United Counties of Prescott and Russell for the very liberal aid granted by that

body, not forgetting the liberal stand taken by the Branch Societies of the United Townships of Longueuil, East and West Hawkesbury, in devoting all the available funds at command, and handing the same over to the County Society, to enable your Directors to sweep away the cloud of debt, that hereafter the Society might progress more rapidly than in years past. * * *

Your Directors would also draw attention to the increased interest taken in the manufacture of butter and cheese throughout the County, as evidenced in the factories established, and contemplated to be established, together with the number of private dairies using improved appliances, in this way improving the *quality* as well as the *quantity*, and to a very large extent competing favourably with the largest creameries, thereby augmenting the price of the production, by throwing upon the market a superior article that gives far greater satisfaction both to the vendor and the consumer.

Your Directors also note with pleasure the growing desire of many farmers within our County to improve their stock, by the importation and use of thoroughbred animals, and feel satisfied that as the good effects of such practice becomes more apparent, by the increased value of the produce of such stock, not only for the dairy, but especially for exportation to the great European market now available to this Canada of ours, that the old idea, that native stock is more suitable to the climate, and more easily kept, will soon explode, and that those harbouring such opinions will have to change, by reason of ocular demonstration, and acknowledge that they laboured under a great mistake, and henceforth will abandon their old fancies and follow the new.

In conclusion, your Directors trust that as this Society is now on a sound financial basis it will meet with that encouragement and material assistance from the farmers, mechanics and manufacturers of the County, as the importance of the interests involved in its prosperity demand, and the wealth and intelligence of a county like the County of Prescott should supply.

PRINCE EDWARD.

The officers and Directors of the Prince Edward County Agricultural Society beg leave to present the following Annual Report, which, with the financial statements exhibited to you, will give, we think, sufficient information respecting the proceedings of the Society during the year 1880, and will also show the financial standing of the said Society.

Your Directors have done all in their power to increase the funds of the Society, and also to make the Annual Show a success; and they are happy to state that the financial standing has improved, and also that the Show in October last was more than usually successful. The exhibits were the best here for years, and the gate proceeds were some \$70 over that of last year.

Some improvements have been made to the grounds, and turnstiles have been put at the entrance.

The prizes awarded were in excess of last year, and so far as they can judge have been entirely satisfactory; and they are convinced that a growing interest is being taken by the farmers and others in the County in the Society. * * *

RENFREW, SOUTH.

Brudenell and Lynedoch.

The Board of Directors of this Society beg leave to report that the total number of subscribers, according to list annexed, was 59, and the amount raised by subscription was \$127.70, or deducting \$5 for subscription not yet paid, \$122.70. The amount of Government grant was \$103. There was awarded in prizes at the annual Exhibition the sum of \$98.85. Though late in the year, the Exhibition was highly successful, and it is important that for the future the show should be held earlier

in the season. The seed wheat distributed last spring has given good satisfaction, though in some localities, and where sown on new land, it suffered from the excessive rain. The highest yield per bushel sown was 23 bushels, and the lowest 12 bushels. It is calculated that there will be about 260 bushels of new seed wheat to be distributed this year as the result of the experiment, and of far superior quality to that purchased by this Society from the Agricultural Emporium at London, Ontario. There is a balance in the Treasurer's hands of \$51.40, which, with the profit to be expected from the sale of seed wheat, will leave us in a very satisfactory condition for the coming year. We recommend that steps be at once taken to purchase two or more pure bred bulls for the benefit of the members. A statement of the accounts is hereto annexed.

McNab.

In presenting to you our report of the proceedings of the past year, your Directors beg to congratulate you on the bountiful harvest which has awarded your labours, the satisfactory state of the lumber business, and therefore the prospect of a greater demand for your surplus agricultural productions—a demand which an Almighty Providence has to some extent graciously enabled you to supply.

Our Society is as useful as ever in promoting the cause of agriculture, the great mainstay of all other productive industries which are essential to national prosperity.

The most careless observer of our Exhibition and Ploughing Match could not fail to notice the intense interest manifested on these occasions; the numerous remarks passed on the merits of the various animals, products and manufactures; the instructive discussions on the implements and ploughing of the competitors for the plough presented by Mr. Bonfield, M.P.P.; and the progressive advancement of agriculture from year to year.

The crop-viewers report as follows: Oats, peas, corn and potatoes, above an average crop. Fall wheat nearly a total failure. Spring wheat scarcely half a crop. Roots, generally good throughout the township, but not extensively planted.

Owing, it seems, to the institution of another branch Agricultural Society in Brudenell, the Government grant was much less than usual, but for further particulars we beg to refer you to the Treasurer's account.

RUSSELL.

The Directors of the County of Russell Agricultural Society beg leave to report as follows:

That the 24th Annual Exhibition was held at the village of Metcalfe on the 17th day of September, 1880, and was considered up to any Exhibition heretofore held by the Society, each and every department being well represented, and the Exhibition Hall in particular being ahead of any former year.

In stock there is a marked improvement in each succeeding year of the Exhibition. The attendance of visitors from all parts was very large, showing and proving the deep interest they take and feel in the County of Russell Exhibition. In the dairy department the entries were large, especially in butter. The samples of grain shown were good, although the wheat crop was rather a failure. Roots were not so good as they would have been if the Exhibition had been held later in the season.

The ladies' department and the display of the handiwork of the ladies of the County it would not be easy to excel.

In the different classes of horses and cattle, the grades shown serve to indicate that the farmers are taking a greater interest in the raising and cultivating a more improved stock.

Your Directors express their regret that a larger number of the farmers and others of the County do not join the Society by becoming members, and make the Society more important and creditable to the County than it even is, the members' subscription being so low—namely, one dollar, which should be no barrier to any party.

Your Directors have to thank the several gentlemen who contributed so large a

number of special prizes, which amount to considerably more than the members' subscriptions, which assisted to add a good deal in addition to the County prizes.

No ploughing match was held by the Society this year, the season being dry for ploughing and the funds of the Society being limited. No doubt the incoming Directors for the present year will see that the usual ploughing match is held at the proper time and season of the year.

Your Directors, in retiring from office, would beg leave to suggest that the incoming Directors of the Society will take an active part and canvass subscriptions, and see that the members' subscriptions are paid in to the Treasurer at a much earlier season than former years, which would relieve your Treasurer from the embarrassment that he has been subjected to in making his returns to the Department of Agriculture, so as to obtain the Government grant.

SIMCOE, EAST.

The following is the Report presented by the Directors at the annual meeting of the Society:—

The Directors of the East Simcoe Agricultural Society, in compliance with the Act, beg leave to submit their proceedings of the past year, and have much pleasure in congratulating the Society upon the success that has attended their efforts during that period. The progress which has attended the Society for the past few years is still on the increase, and your Directors are pleased to be able to state that the late Fall Exhibition was on the whole an improvement on past years. The total entries were not quite so numerous as last year, but in many of the departments they were considerably increased, and a marked improvement was noticeable in almost every department in the quality of articles shown. In the different classes of horses the entries were fewer. Those shown in the agricultural and draught class showed a marked improvement, but the exhibition of roadsters was a miserable failure, and your Directors beg leave to suggest to their successors the desirability of the formation of a rule empowering the judges to withhold prizes from any animal or article that is not worthy of such. In cattle there was a fair show. Durhams were conspicuous by the paucity of the numbers, as also were Ayrshires and Herefords. Devons were numerous, and some very fine animals were shown. In the grade class there was a large competition, the Durham strain being particularly noticeable. The fat cattle shown were fine specimens, and it is to be hoped that next year a keener competition will occur for the Bertram cup. In sheep, all the different breeds were largely represented, and the competition was particularly keen.

Your Directors have much pleasure in informing you that a special prize of \$6 will be given next year (besides the Society's prize) by W. E. O'Brien for the best pen of Southdowns. The show of pigs was not large, but those that were there showed good breeding in their different classes. In poultry the entries were behind those of last year, and your Directors regret to see that a greater interest is not taken by the farmers in the fostering of so profitable a branch of their business. The entries in grain, though not so numerous as on former occasions, were very satisfactory, and the samples exhibited were an improvement on former years, particularly in spring wheat; owing to the failure of fall wheat in this locality, the samples shown were very few. Oats being an abundant crop, the entries were large and the quality good. In barley, peas, timothy and clover seed there were some good samples. The entries in field produce and horticulture far exceeded other years, and had the weather the first day been propitious there would not have been room for all the exhibits in these classes; as it was, the spaces allotted were well filled and the samples shown of an improved kind. The entries in butter were equal to other years, and the display was exceedingly fine, competition being so keen as to try the testing powers of the judges to their utmost. In agricultural implements and carriages, the display was far inferior to other years in numbers. The enlarging of the prize list in the ladies' work department had the effect of increasing the number of entries, and some fine specimens of ladies' handiwork were exhibited. It is expected that next Exhibition will witness a still further improvement in this department. The fine arts department

was a miserable failure, and no improvement can be confidently expected till a fit place is provided for the proper hanging and arranging of works of art.

The Society is to be congratulated on the possession of extensive grounds and buildings; and although a great deal has been done to make the grounds worthy of an intelligent community, yet further improvements are necessary. It would add materially to the efficiency of our Exhibitions, if the live stock and implements could be housed, and your Directors would recommend their successors to make application to the County Council for a grant for that purpose.

The financial state of the Society is good, as will be seen by the Treasurer's returns, and before closing this report your Directors deem it proper to extend their hearty thanks to the merchants and others of the town of Orillia who have so liberally supported them by special prizes during the past year. * * *

SIMCOE, WEST.

While it is to be regretted that the membership, in point of numbers, is not what it should be in so large and populous a county as this, yet we are induced to hope that a more active and pronounced interest is being taken in the success of the Association, and that with reasonable exertion a great many names can be obtained and an increased membership promoted. For this purpose we are of the opinion that some plan should be adopted to induce the farming and manufacturing community to join more earnestly and heartily in co-operation with the Association, and we would suggest to our successors in office that a committee be appointed for that purpose. * * *

It should not be overlooked that only on sufferance are you permitted to hold your Exhibitions in the town park. This, while it continues, is of course an advantage, and in many respects satisfactory. Yet the permission may at any time be withdrawn, and from what your Directors have learned, this is not unlikely soon to be the case, as it is contemplated to lay out the park as a park by planting ornamental trees and otherwise, in which case the privilege we enjoy will most probably be withdrawn. It is therefore of paramount importance that some decided action should be taken towards permanently securing a suitable Exhibition ground, more especially as we find that every year only adds to our difficulty, as the land more convenient to the town is being built upon and otherwise removed from the chances of procurement, while the price of it is increasing. Moreover, your Association is annually put to considerable loss in putting up, pulling down and spending money upon pens and sheds which should be permanent structures. As a beginning in this direction has to be made some time, your Directors are of the opinion the sooner the better, and they are led to believe that if a proper and earnest effort is put forth, means can be readily procured for the accomplishment of so desirable an end.

Though perhaps not as successful as its friends could have wished in all respects, the Exhibition was by no means to be classed as a failure. A large amount of excellent stock was shown. Horses were certainly not up to the standard, either in numbers or quality. The falling off cannot well be accounted for. Thoroughbred cattle were well represented. In Shorthorns, Herefords, Devons and Grades, there were very fine specimens of each class, and your Directors are happy to be able to report that a very marked and decided improvement is going on amongst the farmers in stock-raising, indicating that they have found out that it is to their interest to breed and raise the best animals. The show of sheep was well up in numbers and quality. Cotswolds, Leicesters and Downs were largely represented, while a pen of Shropshire Downs—new in this part of the country—was exhibited by Messrs. McCarthy & Co., and were very much admired. The pigs were scarcely up to the average. Some good improved Berkshires were on the ground. The display of poultry was more than ordinarily good, nearly all the improved breeds being well represented, which attracted a good share of attention. The inside show, particularly manufactures and implements, might have been better, and the same may be said of fruit and garden produce. The exhibit of ladies' work, dairy produce, grain and roots, was very good. * * *

Vespra.

Your Directors beg to report that they can again congratulate you on the satisfactory state of the affairs of the Society.

The Annual Show was a decided success. The prize list was a liberal one, the entries were in excess of former years, the stock and produce brought forward for exhibition all good, and the visitors more numerous than usual.

Your Directors are happy to report that farmers and others are taking a more lively interest in the affairs of the Society and its Exhibition, which must tend to increase its membership and enhance its usefulness.

It has been suggested to your Directors whether it would not be advisable to reduce the fee of membership to a uniform rate of one dollar. Your Directors have given the subject a good deal of consideration, and come to the conclusion that with the present number of members it would break up the Society to adopt that rule. On the other hand, if a membership of at least one hundred could be obtained, the alteration might safely be made with advantage to the Society.

Your Directors appropriated a part of the funds to the ploughing match, which they consider was well spent.

The ploughing match proved a very successful one, and created a good deal of interest outside the Society as well as with its members. The membership was considerably increased through it.

Financially the Society stands well. After paying all demands your Treasurer will have a considerable balance in hand. A detailed statement of the receipts and expenditure will be laid before you.

Barrie Horticultural Society.

The Annual Exhibition was held in the Town Hall on the 11th and 12th of August last, and your Directors are pleased to be able to report that it was a great financial success, the receipts at the door being far in excess of those of any previous Exhibition held by this Society. This was due partly to the very superior display of greenhouse plants, and partly to the musical entertainment kindly provided by several ladies and gentlemen of our town.

Your Directors regret to have to state that there was scarcely any competition in the class for window and cottage gardening, especially set apart for amateurs. This appears to have arisen from a misunderstanding on the part of the public generally, and your Directors would recommend that still greater inducements be offered to amateurs in future.

By the accounts hereunto annexed, which have been duly audited, you will be pleased to learn that there is a cash balance in hand of \$85.10, all liabilities having been paid.

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SIMCOE, SOUTH.

Innisfil.

The business of the Society has been carried on under great difficulties, owing to the low state of the finances and the apathy displayed by the farmers of our township, for whose special benefit the Society is intended. At the meeting held in Lefroy on August 24th, to make arrangements for holding the Annual Exhibition in connection with the Society, your Directors were much mortified to find that the funds at their command were some fifty dollars short of the amount usually offered in prizes, and for some time we had very little hope of being able to hold any Show at all. But in this difficulty we were relieved by the necessary amount being subscribed by the people of Churchill and immediate neighbourhood. Consideration of this fact, and also that the Society has received nearly all its support during the past few years from the people of the south end of the township, led your Directors to decide upon holding the Exhibition in the village of Churchill, but that being a departure from the rule which has been observed for some years, of alternating between the villages of Lefroy, Churchill, and Victoria, your Directors

regret to hear that it has caused considerable dissatisfaction to the residents of the latter village. But your Directors feel that they simply performed an act of justice, considering the assistance rendered the Society by the people of Churchill.

The Annual Exhibition was held on the 1st October, and your Directors are glad to be in a position to state that, notwithstanding the difficulties in the way of sectional jealousies and prejudices, it was a most decided success, the number of entries being greatly in excess of the previous year, and the quality of the exhibits in general much superior.

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TORONTO, E. D.

In compliance with the requirements of the Agricultural and Arts Act, your Directors beg to make the following report of their operations during the past year :

In view of the completion of the new Pavilion at the Horticultural Gardens, and its adaptability for the purpose, your Directors made arrangements with the Toronto Horticultural Society to hold, jointly with them, at their Gardens, a Summer Exhibition of Plants, Flowers, Fruits, Vegetables, etc.; the Exhibition proper to be solely under the control of your Society, the Horticultural Society giving the use of their buildings and grounds, including lighting, etc., and also providing the Musical Department, and receiving one-half the gross admission fees at the gates.

The Exhibition was held on Wednesday and Thursday, the 16th and 17th of June; and, as will be seen by the following report of the Superintendent of the Horticultural Department, was, both as regards the general excellence of the exhibits and the attendance of visitors, a complete success—more so, probably, than any previous Summer Exhibition held by the Society, that of 1877 approaching the nearest.

Your Directors would have preferred holding the Exhibition a week later, and thus have ensured a larger exhibit of fruits and vegetables, and certainly a much larger and better display of out-door roses; but owing to the Pavilion being engaged for the following week, and rather than postpone the holding of the Exhibition to the last day of the month, it was decided to have it on the earlier date. This, if it becomes an annual show, can be obviated in the future.

At the close of the Exhibition, by special request, and with the consent of the exhibitors, the plants and flowers and other specimens were allowed to remain over to the evening of the following day, Friday, the 18th, as an additional feature of the "Concert of the Band of the Queen's Own Rifles," your Society to receive one-fourth of the gate receipts, less advertising, supplementing thereby the funds of the Society by \$28.40.

The number of entries in all classes was 186. The following is the report of Mr. Paxton, the Superintendent of the Horticultural Department :

"It is not too much to assert, emphatically, that this was by far the best Summer Show the Society ever held. The various specimens exhibited on this occasion were a credit to their owners, and would have been no discredit to the Royal Shows of England, more especially the fine foliage plants shown by that enthusiastic amateur, Mr. McCalla, of St. Catharines. These were well-grown plants, clean as a new pin, in the most vigorous health, and showing the most careful and intelligent cultivation. It is pleasant to know they did not leave Toronto, but were purchased by the Horticultural Society to adorn their new Conservatory. Government House contributed many rare and handsome plants, in excellent health and in great variety. Hon. D. L. Macpherson exhibited a table of beautiful and rare plants, well diversified and neatly arranged; not in huge masses of bright colours unrelieved by green foliage, which is always painful and monotonous to the eye, but every plant harmonizing with each other. These were highly appreciated by the large number of visitors at the Exhibition. The whole of the tables were arranged with the same end in view—namely, harmony and effect—although it was no sinecure to keep the different sections together and obtain that object. It is to be regretted that the Show was too early for out-door roses, although the exhibit of tea and other varieties was exceedingly fine. Other cut flowers were well represented, and above the average of other years. Some splendid strawberries were shown. Vegetables, though not numerous, were excellent samples of that early season."

The total subscriptions of members for the year amounted to \$341; the amounts awarded in prizes in the several classes (less diplomas taken in lieu of money), \$217.75. The detailed statement of the Treasurer, as examined and signed by the Auditors, shows total receipts for the year, including a balance of \$260.87 from the preceding year, to be \$1,447.62, and the expenditure \$735.05; leaving a balance in hand of \$712.57.

In conclusion, your Directors feel that they have reason to congratulate the Society upon the result of their year's labours, as shown by the Treasurer's statement; and would most respectfully suggest to their successors in office, that next year, in the event of a similar Exhibition being carried out, a special effort be made to bring out amateurs, by offering liberal prizes, etc., and thus seek to stimulate a love for, and a friendly rivalry to excel in, horticultural pursuits.

VICTORIA, NORTH.

Your Directors, in submitting to your consideration the Thirteenth Annual Report of the Society, have much pleasure in bearing testimony to the returning tide of prosperity in our land, for which we ought to be truly thankful to the Giver of all good.

In reviewing the condition of the crops during the past year, your Directors have to report the all but total failure of the fall wheat crop, owing to an unfavourable winter. The spring crops were, however, good, with the exception of the spring wheat, which can scarcely be called an average crop.

The staple product, particularly in the northern portion of the Riding, during the past year was barley, which yielded an excellent crop and commanded good prices. The peas crop was also a prolific one.

Your Directors would beg leave to draw your attention to another branch of farming deserving of more consideration than has hitherto been accorded it, and which, judiciously managed, cannot fail to be more lucrative to the farming community than their vain efforts in raising the finer grains—we refer to the raising and feeding of cattle and sheep for the foreign market, a trade which promises to be a permanent as well as a profitable one, and for which the northern portion of this Riding is naturally adapted.

Your Directors have also to report that in accordance with your request, as expressed at a public meeting convened for that purpose on the 23rd day of March last, of which due notice was given as by law required—(1) The Annual Fall Shows of the Society have been permanently located at Victoria Road Station. (2) The Society's buildings have been removed from Glenarm and re-erected at Victoria Road, on a lot of four acres of land leased from William McEachern for that purpose, for the term of fifteen years, at the annual rental of twenty dollars, on which the last Fall Show of the Society was held. All this was accomplished at an expense to the Society of two hundred and sixty-four dollars. This matter entailed, necessarily, more trouble to your Directors and occupied more of their time than is ordinarily the case, but they confidently hope that their labours will be amply rewarded in the increased usefulness of the Society in the future, consequent upon the change thus referred to.

The Fall Show of the Society, held on the 29th day of September last, was a most successful one, and augurs well for the future success of the Society in its location.

Your Directors have also bargained for the sale of the lot at Glenarm for the sum of one hundred dollars—fifty dollars thereof payable 1st January, 1882, and the balance payable 1st January, 1883, bearing interest at eight per cent. per annum from date of sale.

Your Directors have much pleasure in acknowledging the kindness of the County Council in a further grant of two hundred dollars during the past year.

VICTORIA, SOUTH.

Your Directors have much pleasure in reporting that, all things considered, the year 1880 may safely be regarded as one of a fair amount of success in the operations of the Society.

At the Spring Exhibition the display of horses was very good. The class and number of horned cattle exhibited a marked improvement on past years, and your Directors would firmly and respectfully recommend that their successors may be induced to offer such further inducements in the way of prizes as may lead to continued improvement in this important class of stock. While this branch has occupied the attention of the Province generally, it is to be regretted that the County has not kept pace with the times; but if the course now recommended be adopted by the gentlemen controlling the Society in the future, there is no reason why the County of Victoria should not be equal in this respect to any in the Province of Ontario.

The receipts at the gates were about \$2 in excess of the Spring Show of the previous year.

At the Fall Exhibition the receipts at the gates were some \$70 in excess of the previous year. The Township of Ops having merged its funds with the South Riding Society, handed over the sum of \$15, being the balance in hand after payment of working expenses and past indebtedness. The sum of \$511.25 was awarded and paid in prizes, being a slight increase on the prize list of the previous year.

Your Directors again beg to point out the serious drain on the funds of the Society to meet the interest on the mortgages, amounting annually to \$375.50. This has an evident tendency to retard progress and curtail the circle of usefulness of the Society generally, and can only be removed by the disposal of part of the property of the Society now not in use; and it is respectfully suggested that an effort should be made during the year 1881 to dispose of the said property on the best possible terms. The balance on hand to meet interest coming due is only about \$200.

Your Directors have to express their regret that, notwithstanding the efforts made to ensure the success of the Central Exhibition of 1880, and the very satisfactory number of entries, the institution was a financial failure to the full extent of the guarantee fund of \$1,000, involving a loss to your Society of \$50, compared with \$10 for the previous year.

The Central Exhibition of the 5th Agricultural District will be held at Lindsay in the fall of the present year, and your Directors venture to say that they are in no way apprehensive of failure in this matter, financially or otherwise. On the contrary, they confidently express an opinion that the result will enable your Society to fully meet its temporary deficiency without in any way curtailing the prize list. This can only be accomplished by the cordial co-operation of the several Societies in the 5th Agricultural District, and the selection by you of such gentlemen in the County as will feel disposed, at the risk of personal inconvenience and loss of time, to use every effort to make the Central a success.

Your Directors now, gentlemen, surrender the trust which you have reposed in them last year, and most cordially thank you for the honour you have conferred on them.

WATERLOO, NORTH.

Your Directors do not feel that they can consistently congratulate the members of the Society on any marked improvement in the exhibits of the last Show in any shape or manner whatever, but regret to state that upon the whole the number of entries was considerably short of what it was in 1879. The reason for such falling off is, in our opinion, a lack of energy on the part of our members, who principally consist of farmers, manufacturers and artists, and when a spirit of enthusiasm ceases to exist with those people, no Electoral Division Society can be successfully kept up.

We may also state that financially our last Show has not been as successful as we anticipated. At the same time, while we complain of the number of entries falling off, we have every reason to congratulate ourselves that our members' subscriptions are about the same as last year, and have not fallen off. The so-called gate money—admission from non-members—fell short a small amount. We have nevertheless in the Treasurer's hands, after paying \$957 in prizes, and in addition thereto the working expenses of the Society, the sum of \$91.50 to our credit for our next Show.

Your Directors feel it their duty once more to urge upon the towns of Waterloo and Berlin the necessity of uniting in procuring a Union Show Ground as nearly central as possible between the two towns, and when such grounds have been obtained then again to approach the subject of amalgamating with South Waterloo Agricultural Society; for we are confident that if such amalgamation should take place both Societies would be benefited, better prizes could be offered, and in general it would make our Shows more attractive than what they have been heretofore.

WATERLOO, SOUTH.

Your Directors have the pleasure of congratulating the members of the Society on what, upon the whole, has been a very favourable season for the farmer. While perhaps there is no one product of the soil above an average, there is no general complaint of any kind of crop being much, if any, below. It is true that fall wheat, both in quantity and quality, disappointed the expectations entertained of it before cutting, but not so much as to reduce it below an average crop. Spring wheat in all its varieties, after repeated trials, has been abandoned.

Dairying has paid well and should be encouraged—if for nothing else, to enrich the soil and prevent it from being run out by continued cropping. But there can be no doubt that fattening stock for the British market is the best paying thing for the farmer at present, and likely to continue so, as there seems little prospect of getting the cattle disease stamped out in the States. It is much to be regretted that so many farmers, by neglecting to use thoroughbred bulls and rams, not only fail to reap the profit themselves, but retard, instead of developing, this profitable trade for Canada. It is the universal testimony of all shippers, that the better bred an animal is the easier it will feed and the more remunerative it will prove to the farmer; and your Directors would urge upon all feeders to select for feeding the best bred animals they can secure. It may be doubted whether so much threshing, before the frost sets in, is profitable or not. Much time is taken up, urgently needed for work on the farm that cannot be done in winter, and much feed is wasted before the spring opens. Newspapers always urge the farmer to sell early, but this year more than usual. Prices were sure to fall; indeed some seemed to doubt if wheat could be sold at any price. And perhaps no year have the farmers more generally threshed and sold in the fall. And with what result? Over and above the loss of both much-needed time and feed, those who threshed and sold in the fall realized somewhat less on wheat, and considerably less on barley, than if they had not sold till winter.

Your Directors regret that at present, in the Province of Ontario, there exists no system by which accurate agricultural statistics can be obtained year by year, and would urge upon the attention of the Minister of Agriculture the question of whether the assessors in the different township municipalities should not be instructed to collect such statistics.

Your Directors cannot close their year's proceedings without referring to the generally good features of the last Show at Galt, and would beg especially to thank the local committee here for their exertions, which tended so much to make the Show a success as an exhibition, and also financially.

WELLAND.

Your Directors, in submitting this the annual report of their proceedings for the past year, would take occasion to express their gratification at the generous manner in which the general public has assisted their designs by their attendance at the Society's exhibition, thereby contributing largely to the Society's funds; they would also tender their thanks to the County Council for the donation presented to this Society.

The Fall Show of the Society was considered fully up in position to any of its predecessors. However, there was a falling off in the entries over the previous year—entries

last year numbering 1,761, this year 1,531, a difference of 230—which may be accounted for from the fact that the day of entry was very stormy, which circumstance partially affected the fees at the gate—fees of former year being \$574, this year \$528, showing a deficiency of \$46.

Your Directors purchased a parcel of land for the enlargement of the Show Ground, which will prove desirable for the accommodation of exhibitors ; so that the Society has now an area of territory of which any Society might well feel proud.

The horse department exhibited some very fine animals, being in great variety and in excellent condition, fully sustaining their position as in the past.

The cattle in Durhams and Grades were well represented in the various classes, reflecting great credit on their owners.

The sheep were in great numbers, and all the classes were filled to the utmost, every prize being taken up ; they were in superb condition, and clearly evinced that their enterprising owners must have exercised great care on them.

The swine were better represented than usual, though sadly deficient in number.

The grain was good, particularly the wheat, the season being good for its early maturing. The roots were all that could be desired in size and abundance ; and the fruit in particular was really gorgeous from its great abundance, and the quality of the several samples shown, all of which abundance and variety should teach us gratitude to the Great Being who supplies them all.

The ladies' department was scarcely up to that of former years, but the excellent samples of ladies' work exhibited clearly evinced that there is plenty of talent in this direction, if it could only be evoked and brought under public notice.

In implements and other manufactures, the show was decidedly the best ever held in this county. The various leading firms in the Province were well represented, and where all did well it would be in bad taste to individualize.

Your Directors would mention with great pleasure the warm interest manifested by Messrs. Thomson & Calcock, of Welland, in the cultivation of the German sugar beet, said gentlemen having given special prizes in this class to the successful competitors, for which your Directors accord hearty thanks.

In conclusion, your Directors would hereby thank the general public for the aid afforded to this Society, and the Board of Managers for their exertions on its behalf.

WELLINGTON, SOUTH.

The Directors of the Central Exhibition, in making their ninth report since the establishment of this Society, beg to call the attention of the members to their proceedings for the past year.

In the first place, a meeting was called for the 24th of January, 1880, to consider the financial position of the Society, and it was shown that the liabilities amounted in the whole to \$2,299.87, and, to try to liquidate this amount, it was resolved to see what could be done by private subscription, and for this end Messrs. Jas. Laidlaw and John and Andrew Whitelaw were duly appointed to canvass the Riding for that purpose. At the same time the President and Secretary were instructed to memorialize the City Council with a view to relieve this Society from a balance due by the Directors, incurred in entertaining the Vice-regal party in September last. We are happy to say that they very liberally relieved us of said liability, for which your Directors were duly thankful. At a subsequent meeting, Messrs. Laidlaw and Whitelaw reported that they had proceeded with the canvass in accordance with the resolution appointing them, but had met with such poor encouragement that they had decided to abandon the project.

At a meeting held in February it was decided not to hold an Easter Fat Cattle Show, as the funds would not allow of it, but some of the Directors were named to seek an interview with the Butchers' Association, with a view of inducing them to take the matter in hand, as it was held to be a great loss not to hold an Easter Show.

A meeting was held in May to decide whether the Society would hold a Show in the fall

or not, and after being fully discussed, it was decided to hold a two days' Show in September, as there would not be time to hold it longer on account of the Toronto Industrial Exhibition taking up the two first weeks in September, and the Provincial the two following, and that would drive us into October, which was thought to be too late, as the weather at that time is doubtful. It was thought that by holding it on the 22nd and 23rd of September, the first week of the Provincial, we would have a better attendance than by putting it off later, especially as no live stock was to be shown there till the last week. We therefore thought that breeders might show their stock here and then go on to Hamilton. Some availed themselves of this, but others did not. Although we could not afford to offer as good prizes, still we thought that, for the credit of their own county, one and all would try and make a good display; but we were greatly disappointed, as instead of having, as we always have been in the habit of seeing, one of the best shows of stock in the Province, we had a very meagre one indeed. It is very evident that with some breeders the dollars more than the honours are courted.

Committees were appointed to revise and cut down the prize list so as to come within the means at our disposal, and at a subsequent meeting the Committees reported that they had reduced the list down to \$1,388.50, including specials.

A Committee composed of Messrs. Hawes, Sorby, Bruce, Laidlaw and Hood were appointed to canvass the city for special prizes, and we are happy to say that the citizens again responded most liberally, as they have always done.

Your Directors petitioned the County Council for the usual grant to the Society, but are sorry to say that honourable body did not see fit to make any grant to agricultural societies whatever. This of course was a great disappointment, and caused the Directors to cut down the prize list lower than they otherwise would have done. We cannot see how the County Council, composed principally of farmers, could by their vote cut off the small grant given towards institutions in which they should take so great an interest and do all in their power to foster. We trust the Council for 1881 will be more liberal, and in future do all they can to encourage their own profession.

At a meeting held on October 2nd, 1880, a resolution was adopted, authorizing a circular to be sent to all to whom prizes had been awarded at the late Show, asking them to allow the whole or some portion of this prize money to be used for the purpose of reducing the heavy debt under which the Central Exhibition was labouring. We are happy to say that some responded very liberally to this appeal, and left the whole of their prize money for that purpose, while some would not leave a cent, although for many years they have been very successful, and have taken large sums from the Society. The whole amount so refunded amounts to \$264.10.

The Show was held, as previously stated, on the 22nd and 23rd of September, and the weather being favourable we had a very fair attendance, especially when we take into consideration the small extent of the Show as compared with other years; and without some attraction we fear the interest in the Exhibition will be confined to those who merely go for the purpose of selling and advertising their stock, etc., and expect to reap a future if not a present benefit.

As regards the quality of the stock on exhibition, it was good. Some very excellent horses were on the ground; especially in the class for carriage horses, many good spans and single animals were in the ring. In cattle, although few of them, still they kept up the reputation of the county as to quality.

In sheep there was a very fine turn-out, the entries numbering about one hundred and fifty. The Cotswolds, Leicesters and Southdowns were about equally represented as to number, and many first-class were among them. While speaking about sheep, it may not be out of place to mention that our enterprising citizen, Mr. George Hood, has again visited the great fat cattle and sheep show at Chicago, and carried off a number of prizes, thus bringing Canadian and American fat stock in competition with others, and this not only in the show ring, but in the shambles, as the animals were slaughtered, and the decision given both as to weight, quality, and amount of offal, and under this severe test the Canadian came out with highest honours.

The show of pigs, although small, was good. Some of them had already gained prizes in Toronto, and after being here went to the Provincial at Hamilton and carried off more

honours, and some of them went from there to London and St. Thomas, and did the same thing there. This shows that even in pigs the County of Wellington is to the fore.

There was but a poor turn-out of dairy produce in comparison to what we have been in the habit of seeing, but of course many rich and good samples were exhibited.

The remaining portions of the Show do not call for any particular mention, except perhaps the grain, roots and fruit. There were some excellent samples of grain, and the roots, especially mangold, were very fine, being the largest ever exhibited here. Fruit was excellent, more particularly apples, of which there were over four hundred entries.

The operations of the past year, although on a much reduced scale, have not been altogether unprofitable, as we have been enabled to reduce the outstanding debt of the Society by \$799.87, besides leaving a balance in the hands of the Treasurer of \$52.14.

Guelph Horticultural Society.

The Directors of the Guelph Horticultural Society beg to present the Annual Report of the Transactions of the Society for the past year, and in doing so would congratulate the members thereof on the success that has attended their efforts during that period. Since the Spring Show has been done away with, the Society has been able to pay all its liabilities and leave a small surplus to carry forward to the next year. It was a great cause of regret to the Directors to be compelled to resort to that expedient, but they could see no other way by which to keep up the credit of the Society and the prizes to a respectable figure, and we would advise our successors to still carry out the same system until they can see a way to increase the revenue.

We are sorry to find that the members' subscriptions for the past year do not come up to those of 1879 by \$26.75. This must be owing to the want of a closer canvass, as we are loth to believe that our citizens have lost interest in the Society.

We have again to congratulate the Society on having obtained the first prize, \$15, for the best collection of plums at the Toronto Industrial Exhibition, and would call for a hearty vote of thanks to those parties who so liberally contributed their fruit for the occasion, and also to Mr. George Elliott, who undertook to collect and forward them to the Exhibition. This is the second time our Society has been successful in obtaining a like prize in the face of strong competition, and we may take this as evidence that in plums at least we can favourably compare with any other part of the Province. Whether this gratifying result is from any advantage in climate, or owing to more care on the part of our gardeners, we leave our opponents to find out.

The Show took place on the 2nd of September, and a large amount of horticultural produce was entered for competition, especially in fruit, which was much larger than in 1879, while vegetables and flowers were not quite so well represented, but taken as a whole was a very creditable display. We missed the large and excellent assortment usually made by the Agricultural College, when our late colleague, Mr. Barron, was gardener. But we have no doubt that Mr. Forsyth, who fills that position now, will next year make as good a display, especially as the President, Mr. Mills, is anxious to encourage anything of this kind taking place in the city.

YORK, NORTH.

Your Board is gratified in being able to report that more than average success attended the operations of this Society during the past year, as evidenced by its increased membership, and increased interest on the part of competitors at the late Fall Exhibition.

During the year a new well was sunk inside the main building for the accommodation of both exhibitors and visitors, and other improvements made, including a new fence from the palace northward, and the repair of a portion of the east line fence of the show grounds, which had been partially destroyed by gales and frost during the early spring.

An excursion on Lake Simcoe was held under the auspices of the Society during the summer, and although not particularly remunerative, it covered all expenses, with \$6 over

to credit of Society, and also afforded a favourable opportunity for farmers to enjoy a pleasant ride and exchange views on matters of special interest to themselves.

The Fall Exhibition held in Newmarket on the Society's grounds and floral hall erected thereon, was above the average, and in some respects excelled the Show of the previous year. This is all the more gratifying when it is recollected that a grand Central Fair was held during the year, covering a period of two weeks, at Toronto, which was expected to detract from the interest in our local County Show.

No doubt the handsome manner in which the business men of Newmarket, and a few private gentlemen in Toronto, aided your Directors in the preparation of a creditable prize list by liberal donations, contributed materially to the success of the Exhibition, and awakened a lively interest among competitors. The entries numbered 1,981, and by reference to the following data, showing the number of entries in each particular class, it will be observed every department of the Exhibition was well sustained, viz.:

Horses.....	195
Cattle.....	71
Sheep.....	131
Pigs.....	50
Poultry.....	129
Seeds and Grain.....	174
Roots, Vegetables, Fruits, etc.....	575
Dairy.....	66
Farm Implements, Carriages, etc.....	176
Domestic Manufactures.....	159
Fine Arts, Fancy Work, etc.....	265

The first day was cold and the weather somewhat disagreeable, but the second day was all that could be desired, and it is estimated that the Exhibition had about 6,000 visitors, exhibitors, judges, etc., on the grounds.

During the evening of the first day your Directors lighted up the large main building for a night exhibition to visitors, and were sufficiently sustained to warrant your incoming Board to repeat it the coming year.

In stock, except perhaps that of cattle, the exhibition exceeded that of former years. In this respect the increase in horses, sheep, swine and poultry is deserving of special mention.

In roots and vegetables the display was worthy of the Riding, while in fruit it was generally admitted by competent judges that the display not only exceeded any former show of this Society, but compared favourably with the exhibition at the Central Fair in Toronto.

Financially the Society may be congratulated. Considering the needs of the Association—not quite so great as in former years—and having a desire to afford the widest opportunity possible, consistent with a due regard to its material interests, for the general public to witness the Exhibition, your Board reduced the price of admission to 20 cents for adults; and it is gratifying to state that this effort to increase the usefulness of the Society was duly appreciated by the community generally, as evidenced by the increased attendance.

The Treasurer's audited accounts show a gratifying surplus over that of last year; and your Board would recommend the incoming Directors to authorize your Treasurer to pay off \$200 on capital account, or else devote that amount to extending stable accommodation, improvement of grounds, etc. Should the same measure of success attend the management of the Association for a couple of years more as characterized it during the past year, your Directors are of opinion that the entire debt against the Society will be liquidated, and its valuable grounds and buildings in the new town of Newmarket entirely free from debt—now valued at over \$5,000.

Reports from King, Whitchurch, East Gwillimbury and North Gwillimbury and Georgina Union Agricultural Societies have been received by your Board. So far as the financial part is concerned, said reports come to hand properly audited, but neither the King nor Union Society of North Gwillimbury and Georgina have a list of the membership-

attached, as required by law, and together with East Gwillimbury are unaccompanied by remarks upon the agriculture, horticulture, etc., of the townships named, as the statute requires.

It does appear necessary to withhold the grant to Societies making default, in order to secure a compliance with the law. Such measures may appear harsh, but when the Government expects County Boards to see that Township Associations comply with the law, there seems no other method of enforcing the requirements of the statute. For the present year your Board has desired the Secretary to again write the respective Township Boards, and to admonish them of consequences unless the statute is complied with relating to Annual Reports hereafter.

King.

[SECRETARY'S LETTER APPENDED TO FINANCIAL REPORT.]

I thought it would be well to accompany the Annual Report by a few remarks upon the present standing and growing prosperity of King Township Agricultural Society. You will no doubt notice the considerable increase of total amount awarded in prizes over the year before. This is owing to the Board having increased the prizes in the different classes, and also created some new classes that were not heretofore. There is one class, "Dairy," the amount of which to you will appear small, but it must be remembered that to this class invariably are all the specials given, which I think will make the total in this class three times what it appears in the report. We always have a splendid stock show in this township; and our fine arts the last year exceeded anything we have had hitherto,—accounted for no doubt by the Board revising the list and raising the prizes in that department.

The crowning success of last year has built for us a lasting reputation, and I am sure that there is every indication that the Society is gradually on the increase.

Whitchurch.

Your Directors are thankful to kind Providence for a bountiful supply of pure air—about the only exemption from "*Protection*," and that which no debt, except the debt of Nature, can deprive us of.

Thou shalt not covet that which belongs to thy neighbour is a Divine inference worthy of consideration in the effort to add West Gwillimbury to the County of York.

The opening up an avenue through our own territory to the lands of the great North-West will be of great value to our agriculturists who wish to migrate, if all the lands in the respective counties are subject to the cost of building roads and other improvements, and the conditions of land sharks are avoided.

Your Directors have sympathized with you for the destitute of Ireland, and have cheerfully joined in contributing to relieve their wants; but charity to a class of people who are seeking to live on riot and mob law, and who are backed in their efforts by a class on this side of the Atlantic who are seeking an opportunity to depopulate Canada, is not worthy of commendation and such charity ceases to be a virtue.

In agricultural matters your Directors are pleased to report that the crops for the past year have been above an average in this township, except fall wheat, which was nearly a failure.

The Society held their Fall Show at the village of Stouffville on the last day of September and the first day of October. It proved a success beyond the expectations of your Directors. The prize list was comparatively large, many of them not having been competed for. The attendance of visitors was very good, say an average of other years. The animals on exhibition were what may be expected in an importing district. Grain, roots and vegetables excellent, and ladies' department all that could be desired.

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YORK, WEST.

Your Directors, in presenting their Annual Report, feel that they have much reason to congratulate themselves and you on the success that has attended their efforts during the year now passed.

As heretofore, during the years preceding, a union was formed between your Society and that of the Township of Vaughan, which proved of considerable advantage to both. Your Directors felt justified in making an effort to continue the union, and it is gratifying to them to be able to say that they succeeded in forming it on a favourable basis, and the prosperity of your Fair has been greatly enhanced thereby.

The entries at the Fall Exhibition were not quite up to the number of the preceding year, owing to the fact of other adjoining Societies holding their Fairs on the same days as that of your Society. Still though the number of entries were somewhat less, yet the receipts at the gates were almost equal to that of the preceding year, thereby showing that the public appreciated the efforts put forth by your Board, and also showing that your Society still retained its former prestige. The number of entries in the different classes were as follows: Horses, 259; cattle, 71; sheep, 101; pigs, 49; poultry, 88; roots, 113; fruit, 148; grain and seeds, 64; implements, 71; dairy produce, 140; home manufactures, 103; ladies' work, 378; fine arts, 61; extras, 23—total 1,669; being a decrease of 190 on the number of the previous year.

It is, however, gratifying to your Directors to be able to state that there continues to be a very noticeable improvement in the stock shown. Your Directors also succeeded in having made a new and spacious ring for the better exhibit of horses. The present ring is over a quarter of a mile in circumference, and has afforded better accommodation not only for the general public but also for those exhibiting; and your Directors feel safe in saying that it will no doubt be the means of bringing out a better class of stock and a greater gathering of people at the coming Fall Fair.

Your Directors would beg to call your attention to the cheese and butter industries. Your Board are of opinion that the establishment of cheese factories or creameries in this section would be of considerable advantage, not only to those engaging in it directly, but to the general public, and would also increase the wealth and prosperity of your townships. The present system of farming is a judicious rotation of crops, with a large breadth to feed stock on during the long winter, thereby improving the quality of the manure heaps. But it should be borne in mind that the cattle on the farm require improving, and the farmer should, in considering the various sources of his wealth and income, take into consideration "the cow and the grass she feeds upon," and he will find that it is a most important question to consider. A poor cow takes up about as much room as a good one, and requires as much food, care and attention, so that the actual difference in an improved breed, and the amount of beef and quality of milk between the two, is clear profit. A cow that will give one quart of milk more at a milking than another, is worth \$20 more than the other. No doubt this seems somewhat exaggerated, but it is really a fact. The extra quart at each milking would in one season amount to between five and six hundred quarts, worth at least \$25 or over.

Then regarding cattle for export, your Directors think this of itself a strong argument in favour of increased efforts on your part to get into a larger and more improved breed generally. The export trade is advancing, and it has evidently had quite an effect on the British stock-breeding already. The statistics for the United Kingdom of Great Britain and Ireland for the past year show a decrease as follows, viz.: in cattle, 90,373; in sheep, 2,000,000; in pigs, 314,668. These are significant figures, and portend high prices for stock and meat during the "good times coming." We have before stated that the good cow requires no more keep than the poor one, and in milking qualities far excels; this then is the cow to keep, and her progeny are the ones from which the herd should be replenished.

Your Directors are glad to congratulate you on the abundant harvest, although the fall wheat was winter-killed and rusty, and the early rains in this immediate vicinity caused it to grow up grassy, consequently it was considerably below an average. But the barley in this vicinity was good, and with but few exceptions was well harvested and got housed before any rain came on it. The oats were good and spring wheat poor, and the peas badly hurt by the pea bug.

Regarding the price of grain, we would submit that a good rule for the farmer is to sell his grain when he has it ready for the market, and thereby avoid all the risks which attend his holding it for a better price. This year this advice would appear to be undeniably

sound, according to calculations made as to the supply and demand. Last year it was estimated that Europe fell short 256,000,000 bushels of supplying the wants of her own people, and that America had a surplus of 180,000,000 bushels over supplying her own demands, which would leave 76,000,000 bushels to be supplied by Canadian and other farmers. The returns this year show the American surplus at 200,000,000 bushels, and the European deficit at only 172,000,000, so that there is no deficiency to be made good, and there will consequently, on this sort of calculation, be no higher prices ruling in Canada.

Your Directors would also submit for your consideration the advantages to be derived from tile draining. A good tile drain, when once down, will last for sixty years. Drainage deepens the soil. If the soil is full of water, the roots of plants will all be found within a few inches of the surface; but if we drain, the action of the air and frost will deepen the soil, and the roots of wheat and other grains will penetrate to a depth of five or six feet in land drained to that depth, and as a consequence the fall wheat and clover are not so apt to be heaved up by the continued freezing and thawing in the spring. Then we find that drainage makes soil damper in dry weather, because it makes it mellow and more capable of retaining moisture; and it warms the soil, because it gets the cold water out of it in the spring, and the warm rains soak downward. If the water were to lie there and evaporate it would cool the soil, because evaporation is a cooling process. Water is indispensable to the growth of vegetation, and requires a temperature not below 45 degrees nor above 95 degrees Faht. Corn must have 10 degrees more than wheat, and careful experiments have proven the fact that all crops grown increase as the square of increase of the temperature of the soil. For instance, a good soil at 60 degrees might produce 25 or 30 bushels of corn to the acre; but if the temperature could be increased to 80 degrees, 100 bushels to the acre would be the result. We can plough and the land could be planted earlier in the spring and sooner after it rains. Spring water absorbs carbonic acid, and carbon is the great element in plant life; hence water oozing out of the ground robs the plant of nearly all its food by evaporation. But drainage stops all that, and assists the plant by leaving the carbon, the food on which the plant lives, for it to live on.

TABULATED ANALYSIS OF REPORTS

OF

Electoral District & Township Agricultural Societies

AND OF

HORTICULTURAL SOCIETIES,

FOR THE YEAR 1880.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From Other Societies, for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
ADDINGTON:																						
Camden	44	48	142	00	700	00													842	00	38	62
Longboro'			102	00	167	00													313	48		
Portland	17	40	52	00	98	50													150	50		
			52	00	84	00													153	40		
ALGOMA:																						
Assignack	1	86	240	50	700	00			12	70			43	90					998	96		
Howland	41	86	37	00	140	00	250	00									3	13	471	99	61	69
	55	41	35	00	140	00	20	00											256	41		
BRANT, NORTH:																						
Onondaga	607	72	310	50	700	00	175	00	326	93							84	69	2204	84		
	24	94	89	00	140	00	20	00	8	45							11	00	243	39		
BRANT, SOUTH:																						
Burford	15	01	1475	15	700	00	575	00	2474	06									5221	22	49	04
	35	25	291	00	140	00			364	00	350	00	400	00			32	25	1612	50		
BRUCE, NORTH*:																						
Union Exhibition	157	60	81	50	700	00													1389	10		
Arran	108	36	360	50					348	00					481	72			1298	58		
Bruce	58	52	161	00	61	67	25	00											374	50		
Elderslie	136	47	174	50	71	12	30	00	20	25									432	34		
Saugeen†			134	47															134	47		
Tiverton Horticultural	86	89	84	00	37	62	30	00	120	50					407	48	122	50	888	99		
			236	00	93	59			35	15							11	00	375	74		

* United with Elderslie for Union Show in Paisley.

† Port Elgin Horticultural united.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts and Ladies' Work.		Prizes for Ploughing.		Prizes for Previous Years Paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibition.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
AMHERSTON:	41	74	350	00	199	00	76	25	149	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	64	63	880	62	.....	.....
Canden	134	00	57	00	61	75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26	95	279	70	33	78
Loughboro'	2	65	.....	.....	70	50	41	10	17	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10	33	145	73	4	77
Portland	60	70	14	65	39	80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36	74	151	94	1	46
ALCOA:	280	00	66	50	96	50	18	25	.....	.....	192	50	123	50	.....	.....	22	63	242	25	996	63	2	33
Assignack	97	50	41	75	21	50	.....	.....	3	00	.....	.....	.....	.....	290	43	79	50	533	68	.....	.....
Howland	57	00	34	50	24	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69	68	185	68	65	73
BRANT, NORTH:	140	00	583	00	160	50	162	25	.....	.....	13	25	.....	.....	.....	.....	78	95	238	75	1376	70	828	14
Onondaga	161	50	50	25	42	75	.....	.....	0	25	.....	.....	.....	.....	.....	.....	33	78	288	53	4	86
BRANT, SOUTH:	140	00	1628	75	684	50	487	90	.....	.....	96	50	.....	.....	.....	.....	1643	93	588	68	5270	26	.....	.....
Burford	4367	25	96	00	78	75	.....	.....	19	25	.....	.....	.....	.....	1000	26	120	39	1592	15	20	35
BRUCE, NORTH:	420	00	.....	.....	.....	.....	.....	.....	.....	.....	16	17	.....	.....	347	20	.....	.....	48	00	831	37	107	73
Union Exhibition	514	75	196	75	167	50	.....	.....	.....	.....	.....	.....	.....	.....	65	60	251	75	1196	35	102	23
Avon	112	00	76	25	55	25	.....	.....	0	50	.....	.....	.....	.....	3	55	65	53	312	08	62	42
Bruce	116	00	64	50	50	50	.....	.....	11	25	.....	.....	.....	.....	20	00	58	26	390	51	111	83
Elderslie	5	00	.....	.....	.....	.....	.....	.....	21	11	26	11	.....	.....
Sauguen	209	00	118	15	121	50	.....	.....	44	25	.....	.....	.....	.....	154	48	235	30	882	68	6	31
Tiverton Horticultural	105	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	139	45	49	20	553	65	22	09

* \$45.50 of Prizes unpaid.

+ \$29.75 unpaid.

+ Merged in Union Exhibition.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies. — *Continued.*

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and		Legislative Grants.		Municipal Grants.		Rents of and Admision to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From Other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
BRUCE, SOUTH:																						
Northern Exhibition.....	49	29	307	00	700	00	200	00	1400	05	1480	00			810	50	136	15	1007	00		
Brant *	3	26	273	50	30	27	100	00	28	10									4349	99		
Carrick			60	00					12	40									93	53		
Culross	86	69	84	25	44	39	33	29	12	48									286	14		
Greenock			83	00	33	29													215	38		
Huron			98	00	43	38													133	48		
Kincardine.....	17	29	147	75	81	00	20	00	28	80									298	29		
Kinloss	13	02	80	25	39	35	25	00	7	95									212	02		
Walkerton Horticultural +.....	133	13	212	00	98	12	90	00	180	50									723	75		
	14	30	96	00	48	43													158	73		
BROCKVILLE, E. D.:																						
.....			69	15	700	00	100	00	335	18									1315	58		
CARDWELL:																						
.....	53	05	422	00	700	00	25	00	362	55					173	55			1736	40		
Adjida			136	00	118	00	25	00	74	45									369	55		
Albion			135	20	96	00	50	00	55	30									336	75		
Caledon	197	79	137	75	119	00	50	00	239	61									837	80		
Tecumseth \$	53	05	32	50	86	00	25	00							166	19			362	74		
CAMLETON:																						
.....	108	41	313	00	700	00	500	00	332	98									1954	39		
Fitzroy	9	91	82	00	105	00													196	91		
Gower, North.....	51	16	89	00	105	00			19	06									244	22		
March	2	36	79	00	105	00													133	64		
Huntley			144	00	105	00			22	00									271	00		
CORNWALL, E. D.:																						
.....	28	41	150	00	350	00			56	75									385	16		

* United with Electoral District Society for Northern Exhibition.

+ United with Electoral District Society for Exhibition.

* \$153.25 of Prizes not lifted, leaving balance due Treasurer \$14.75.

\$ United with Electoral District Society for Exhibition.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts and Ladies' Work.		Prizes for Ploughing.		Prizes for Previous Years Paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibition.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Total of Expenditure.		Balances in hand.	
	£	c.	£	c.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.	£	s.
BURTON, SOUTH.																										
Northern Exhibition			418	70	665	00	414	75	416	75			107	00			583	60	1730	00	2	00	1003	70	3	30
Brant					76	00	42	66	22	00			34	75			81	50	1730	00	948	65	4282	15	67	84
Carleton Place	111	29			77	25	26	75	25	75			3	00					16	20	10	00	91	50	2	03
Cullross					55	75	42	50	40	75									5	00	27	30	340	20		
Greenock		3	59		130	50	72	50	44	00											34	00	166	75	47	63
Huron					88	45	38	75	15	50									8	00	49	35	296	35	1	94
Kincardine					122	00	71	00	35	75			3	50			146	00	125	00	89	91	467	16	256	59
Kimross																					1	00	147	00	11	73
Walkerton Horticultural																										
WALKERTON, E. D. *	209	12			523	00	267	30	322	65									127	66	328	01	1471	54		
CAKOWELL, F.			419	00	317	00	136	00	101	00	104	25							87	33	239	43	1404	01	4332	39
Adjalla	84	01			215	00	70	00	80	00											83	61	537	53		
Albion	15	19			183	75	42	00	117	75									20	00	78	94	457	63		
Caladen					187	00	206	00	169	97											193	00	755	97	101	83
Teunisseth																	196	55					196	55	166	19
CARLETON.			420	00	555	00	165	00	107	00	23	00	19	50					304	72	191	20	1865	42	88	97
Fitzroy					90	00	102	25	42	50													137	91		
Gower, North					87	00	58	00	39	50											31	90	236	90	7	32
March					116	25	56	82													19	00	192	07	1	57
Hundey					119	20	73	00	41	50											23	30	257	00	14	00
CORSWALL, E. D.					178	75	87	00	102	50					2	00			47	26	102	05	519	56	65	60

* \$206.25 retained for Membership.

† United with Teunisseth for Exhibition.

‡ Half paid to Teunisseth.

\$898.36 of Prizes retained.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.	Subscriptions and Donations.	Legislative Grants.	Municipal Grants.	Rents of and Admissions to Grounds.	Moneys on Loan.	Sale of Machinery, Stock, Seeds, etc.	From Other Societies for Amalgamation.	Miscellaneous Minor Receipts.	Totals of Receipts.	Balances due Treasurer.
	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.	\$ c.
DUFFERIN:	103 78	1221 50	700 00	100 00	104 85				35 00	2961 03	
Melancthon		194 00	*269 20	25 00	203 65				32 00	723 85	
Orangeville Horticultural	61 90	72 25	65 79		6 73					206 67	
DUNDAS:		294 00	700 00		203 60				12 70	1210 30	
Matilda	63 65	139 00	118 56		102 30				18 50	462 01	
Mountain	24 82	81 00	61 54						4 00	171 36	
Williamsburgh	58 92	128 00	93 60		53 25				10 50	344 27	
Winchester	73 16	185 00	140 00		31 78					429 94	
DURHAM, EAST:†		82 00	700 00							782 00	29 39
Cavan	1 52	259 75	140 00	300 00					283 25	984 52	
Manvers	104 60	74 00	140 00	25 00					14 00	463 15	
Hope§	1 52	259 75	140 00	300 00					283 25	984 52	
DURHAM, WEST:	141 19	109 00	700 00	775 07				185 23	66 00	1977 29	
Cartwright	124 81	135 00	118 21		140 10					538 15	
Clarke||	198 72	198 00	133 44	84 00	260 40				8 00	882 56	
Darlington		112 00	85 40							197 40	
Bowmanville Horticultural	23 43	48 60	36 60							115 73	
Newcastle Horticultural		59 00	44 87		9 60					113 47	

* Including Grant of \$129.20 for 1879.

† United with Central Association for Exhibition.

‡ United with Central Exhibition.

§ United with Central Exhibition.

|| United with Electoral District Society for Exhibition.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Poultry Products.		Prizes for Manufactures, Fine Arts and Ladies' Work.		Prizes for Ploughing.		Prizes for Previous Years Paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s
DUFFERIN:	140	92	205	79	862	50	468	50	250	75			2	00					570	17	240	40	2888	11	102	92
Melancthon					130	00	83	50	93	00			5	25					83	69	99	60	631	21	92	64
Orangeville Horticultural							138	00													18	00	161	25	45	42
DUNDAS:	20	77	413	78	266	25	76	55	138	00									81	48	158	76	1155	59	54	71
Madira					137	00	55	00	80	25			30	00					26	40	74	54	403	19	58	82
Mountain					70	75	18	35	44	05											11	47	147	62	23	74
Williamsburgh					109	05	32	10	62	85									52	00	45	82	301	82	42	45
Winchester					187	40	37	90	46	50			10	00					5	00	73		360	67	69	27
DURHAM, EAST:	20	39	420	00	*40	00											320	00			50	00	810	39		
Cavan					106	25	54	75	60	50			27	00			260	72	570	00	34	00	919	72	34	80
Manvers					440	00							14	50			260	72	570	00	49	61	433	61	29	54
Hope													27	00					570	00	52	00	949	72	34	80
DURHAM, WEST:			418	59	699	00	305	00	245	00							50	13	20	11	129	66	1917	49	59	80
Charlwright					223	50	81	25	83	75			11	30					21	00	71	63	495	63	42	52
Clarke					263	25	120	40	257	50											85	00	732	15	150	41
Darlington																	185	23			12	17	197	40		
Bowmanville Horticultural							78	75													16	45	95	20	20	53
Newcastle Horticultural							47	75													11	45	59	20	54	27

* Spring Show.

+ Spring Show.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balance due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
ELGIN, EAST : *	197	19	114	50	700	00	1440	00	3701	30	4000	00					980	45	1011	69		
Southern Exhibition †			2148	76					40	25							35	42	1225	51		
Bayham	26	16	125	50	25	15			11	50									252	48		
Dorchester, South	69	22	242	00	50	50			173	28							37	25	373	22		
Malahide	239	03	243	00	50	53			38	10	150	00					16	00	746	09		
Yarmouth			162	00	39	10													405	21		
St. Thomas Horticultural			1427	00	140	00			64	00							0	82	1567	00		
Springfield Horticultural			153	00	28	07													245	89		
ELGIN, WEST :	60	76	223	00	700	00			623	21							9	85	1616	82		
Aldborough	100	65	118	00	140	00	25	00	258	00							0	25	621	90		
Southwold and Dunwich	83	35	186	00	140	00			87	88			1125	50					1622	73		
Essex, North :	79	53	171	00	700	00	100	00	200	00							10	00	1260	53		
Maidstone and Sandwich.	198	82	83	00	131	78													413	60		
Rochester and Maidstone	129	88	98	00	169	20											53	00	450	08		
Tilbury, West	164	15	84	00	118	77			13	90							20	50	401	32		
Essex, South :	193	01	179	00	700	00	100	00	254	91							13	00	1439	92		
Colchester	20	22	202	00	81	26			67	87			67	70					439	05		
Gosfield	161	08	156	00	103	59			57	50							9	00	487	23		
Malden and Anderson	56	60	161	00	79	02	50	00	100	20							12	00	458	82		
Mersea	50	50	237	00	156	05							385	01					528	56		

* United with St. Thomas Horticultural Society, Southern Fair.

† Comprising East Elgin Electoral District Society and St. Thomas Horticultural.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies. — *Continued.*

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.	Legislative Grants to Township Societies.	Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢
ELGIN, EAST :																								
Southern Exhibition ..		333 39																						
Bayham ..			2690 25*																					
Dorchester, South ..			193 00		47 28		21 44				17 25						169 63	524	1523 75		897 27	114 42		
Malahide ..			183 75		52 85		54 50				21 16						5 58		42 31		230 77	21 71		
Yarmouth ..			247 75		106 95		65 55				10 75						263 99	87 65	96 50		773 09	27 00		
St. Thomas Horticultural ..	60 13										70 64						142 55				369 82	35 39		
Springfield Horticultural ..					122 15																1567 00			
																					156 46	89 41		
ELGIN, WEST :																								
Maidstone and Sandwich ..		280 00	511 90		142 93		257 59				55 50						200 42		263 34		1676 88			
Aldborough ..			102 36		21 50		22 90				19 05						248 00		98 97		512 78	109 12		
Southwold and Dunwich ..			164 00		58 25		80 75				17 70						33 50		132 40		1148 69	474 04		
ESSEX, NORTH :																								
Maidstone and Sandwich ..		419 75	389 00		118 00		93 25				3 00								123 19		1146 19	114 34		
Rochester and Maidstone ..																					41 00	372 60		
Tilbury, West ..																	46 85		37 25		252 85	197 23		
																			24 51		458 14			
ESSEX, SOUTH :																								
Colchester ..		420 00	381 50		137 30		122 55												176 20		1237 55	202 37		
Gosfield ..					17 45		20 25				2 00								39 27		241 24	197 81		
Malden and Anderson ..			133 00		34 95		42 25												70 39		361 67	125 56		
Mersa ..			145 00		52 90		72 35												86 67		376 42	82 40		
											0 50								141 50		565 43	265 43		

* Total amount, separate classes not returned.
+ \$1,045 Mortgage.+ 9.55 of Prizes unpaid.
\$ United with Southern Exhibition.|| \$34.80 Prizes unpaid.
* For Live Stock.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—*Continued.*

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
FRONTENAC:	792	73	732	50	700	00	300	00	1441	71							143	98	4113	92	0	10
Kingston	8	50	68	50	79	90													136	90		
Stormington	3	91	37	00	111	00													151	91		
Pittsburgh			24	42															21	42		
GREENVILLE, South:	8	84	284	00	700	00	200	00	481	91							145	70	1820	48	2	48
Edwardsburgh	59	76	72	73	140	00	20	00	71	80									364	29		
GLENGARRY:			35	00	700	00			80	15							8	00	1138	15	87	51
Lochiel and Kenyon	13	02	72	50	140	00													225	52		
GREY, NORTH:			372	00	700	00	250	00	90	50	90	00					17	00	1519	50		
Derby	39	91	108	00	69	20	25	00									8	00	260	36		
Keppel	63	11	72	00	63	00	12	00					30	00			3	00	243	71		
Sullivan	18	71	64	00	53	16	30	00	5	40									171	27		
Sydenham	37	33	125	00	102	25			8	40									272	98		
St. Vincent	86	01	241	00	125	80			68	65							19	00	539	86		
Owen Sound Horticultural	123	41	161	50	125	36			87	10							23	03	529	40		
GREY, EAST:	36	78	136	00	700	00	200	00	133	80					50	00			1236	35	67	72
Artemesia	8	85	27	00	26	00													61	85		
Collingwood	182	27	173	00	86	84	74	81	130	50							6	50	634	02		
Enfursia			117	00	114	56	50	00	65	00							88	75	437	31	32	40
Holland	4	08	133	00	99	55	28	45											265	08		
Osprey			64	00	41	17	11	76									2	00	118	93	9	13
Proton			88	00	23	70	106	70	173	00									392	00		

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—*Continued.*

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Fardens and Dairy, Products.		Prizes for Manufactures, Fine Arts and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
FRONTENAC:																										
Kingston	190	90	1107	75	410	75	681	75					14	00					254	80	943	69	3603	74	510	18
Storrington			141	75*																	15	25	157	90		
Pittsburgh			80	50	27	86	11	60													13	42	140	83	11	08
																					14	60	14	60	9	82
GRENVILLE, SOUTH:																										
Edwardsburgh	140	00	252	00	158	00	210	00					86	00					499	00	477	46	1822	96		
			84	25	84	75	49	50													72	42	290	92	73	37
GLENHARRY:																										
Lochiel and Kenyon	62	80	421	04	162	92	174	29											27	96	236	69	1225	61		
					104	57	15	27													27	60	224	69	0	83
GREY, NORTH:																										
Derby	23	47	540	00	370	50†							75	00					106	39	180	20	1295	56	223	94
Kepcol			70	75	50	50	17	25													54	56	221	81	38	55
Sullivan			68	75	44	30	18	92													64	35	211	33	32	38
Sydenham			68	45	46	40	25	25											2	53	14	15	156	88	14	39
St. Vincent			82	50†	64	00	28	95											10	83	33	35	206	18	66	80
Owen Sound Horticultural			466	50‡															18	12	48	15	532	77	7	09
					236	50													17	35	125	57	369	42	130	98
GREY, EAST:																										
Artemesia			248	00	151	00	67	50					20	95					153	88	262	97	1324	30		
Collingwood			210	25	85	50	126	00													1	27	51	27	10	58
Euphrasia	11	41	104	50	61	50	56	75					39	25					19	04	102	38	602	40	51	61
Holland			90	25	93	00	39	25					3	00					137	30	56	25	469	71		
Osprey			51	00	25	00	19	50													34	45	256	95	8	13
Proton	9	97	74	75*	46	00	37	25											1	00	23	59	128	06		
																			19	64	45	87	212	76	179	24

* Total only returned.
 † Total, not returned in classes.

‡ \$13.50 of Prizes unpaid.
 § Total, not returned in classes.

|| \$120 of County Grant paid to Township Societies.
 • \$10.75 unpaid.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
GREY, SOUTH:																						
Bentick	65	45	477	00	700	00	200	00	356	15									1798	60		
Egmont	12	78	30	00	76	87	41	96											161	61		
Normalby	74	25	166	80	140	00	40	00											421	05		
	40	30	95	00	169	80	106	38	7	00									390	98		
HALTON:																						
Esquesing			267	50	700	00	100	00	870	89									1638	39	140	57
Nassagaweya	68	65	300	00	105	81	50	00	161	98									688	94		
Nelson			164	00	60	32			15	00									285	32		
Trafalgar			308	50	113	80	60	00	78	25									560	55		
	27	59	1074	00	140	00	300	00	228	70									1815	04		
HALDIMAND:																						
Cayuga, North	134	63	160	00	700	00	45	00	190	00									1229	63		
Dun and S. Cayuga			124	25	80	47	25	00											230	02	1	88
Rainham	15	21	68	80	33	92	25	00	3	85									147	78		
Seneca and Oneida	12	60	101	51	63	92	25	00	1	35									204	37		
Walpole	5	95	190	00	126	25	50	00	19	29									387	49	39	69
			258	00	115	05	50	00	218	25									646	30		
HAMILTON, E. D.:																						
*	473	32	122	00	350	00													964	17		
HASTINGS, NORTH:																						
Dungannon and Faraday	91	38	84	00	648	00													827	88		
Tudor and Limerick	43	72	42	00	80	00			1	10									201	28		
Rawdon	9	25	45	00	80	00													134	25		
			71	00	100	00													100	71	12	27

* United with Provincial Exhibition.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
GREY, SOUTH:																										
Bentick			420 00		318 50		191 50		129 25										322 55		224 76		1606 56		192 04	
Bentick					68 00		96 90		11 25				14 00								34 69		154 84		6 77	
Egmont					119 50		48 75		59 25		38 00								2 00		44 92		312 42		108 63	
Normanby					91 75		80 00		75 25				4 75						8 00		99 50		350 25		40 73	
HALTON:																										
Esquesing	81 97		420 00		739 50		173 25		320 25				41 00						44 63		258 35		2078 96		81 78	
Nassagaweya					242 00		79 00		73 25		56 00								17 99		139 92		607 16			
Nelson	8 12				144 50		49 50		41 00										7 50		20 68		307 47		20 08	
Trafalgar					267 00		95 50		114 00										1095 28		126 50		1638 28		116 76	
HALDIMAND:																										
Cayuga, North			418 87		398 00		71 25		88 00										9 50		96 05		1081 67		147 96	
Dun and S. Cayuga					105 87		40 40		38 58										6 00		41 05		231 90			
Rainham					79 30		16 40		9 05												31 50		135 25		11 53	
Seneca and Oneida					110 75		21 75		27 00				5 75						0 75		25 05		591 95		12 42	
Walpole					251 75		54 50		75 25										81 25		55 68		437 18		43 53	
Wapole					280 25		61 50		83 50														692 77			
HAMILTON, E. D.:																	122 00				24 25		146 25		817 92	
HASTINGS, NORTH:																										
Dungannon and Faraday			260 00		202 75		70 45		106 16				3 50		33 96				53 10		68 57		761 01		66 87	
Tutor and Limerick					46 25		47 75		24 00												23 47		178 93		22 35	
Pawdon	0 57				50 45		18 95		8 20										10 00		35 25		117 85		16 49	
Pawdon					82 60		33 35		28 30												38 45		183 27			

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies. — *Continued.*

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
HASTINGS, EAST:																						
Hungerford	63	98	177	00	700	00			32	85							10	55	940	00		
Tyendinaga	9	57	58	00	140	00											6	90	282	81		
			68	50	140	00													218	07		
HASTINGS, WEST:																						
Belleville Horticultural	241	94	160	00	700	00			203	02									1304	96		
	228	46	32	00	140	00													400	46		
HURON, EAST:																						
Grey	166	76	82	00	700	00	100	00							200	00			1248	76		
Howick	51	09	137	00	99	55	14	23	300	74							20	00	631	61		
Hullett	78	30	25	80	26	90	3	84									48	00	182	84		
Turnberry			328	00	97	20			238	33							376	00	1039	73		
Morris	136	10	293	65	142	10	20	27	135	85							40	15	830	12		
	121	77	327	00	152	35													662	87		
Wroxeter Horticultural *			79	00	19	30	2	84	109	94									211	08		
HURON, WEST:																						
Colborne†	34	83	115	00	700	00	100	00	297	95					726	00			1973	78		
Wawanosh, East			111	00	45	50	6	45											162	75		
Wawanosh and Ashfield	144	02	200	50	98	70			54	25									497	47		
Goderich	8	49	138	00	59	75	8	50	49	00									283	74		
Goderich Horticultural †	162	59	308	25	140	25	100	00									34	75	745	84		
HURON, SOUTH:																						
Hay	124	91	199	75	700	00	99	75					10	00	700	00			1839	41		
Stanley	156	63	162	25	68	66	10	60	85	00									539	64		
Stephen			192	50	104	02			60	00									356	52		
Tuckersmith	148	05	370	00	160	60													1203	30		
	121	20	341	00	100	31	15	49	508	56	200	00							1291	56		

* United with Electoral District Society for Exhibition.

† United with Electoral District Society.

‡ United with Electoral District Society.

§ United with Electoral District Society for Exhibition.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balance due Treasurers.		Legislative (Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		(Grants to Union Exhibitions.		Buildings and (Grounds, Interest & Insurance.		Workings and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.		
	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%	
HASTINGS, EAST :																											
Hungerford		280 00		241 25*		62 80		74 00						24 20						163 25		101 75		861 15		78 95	
Tyendinaga				95 10		51 65		59 35												4 00		21 65		258 35		24 16	
.....				68 50		32 25		33 15												19 70		38 60		182 50		55 57	
HASTINGS, WEST :																											
Belleville Horticultural		140 00		255 70		29 25		63 50					28 75							503 94		157 93		1179 07		215 89	
.....						151 20							2 25								16 60		170 05		330 11		
HERON, EAST :																											
Grey		480 00		269 00		83 75		93 00					152 25							258 40		121 70		1199 70		49 06	
Howick		143 25†		59 00		48 00		18 65					33 03							1 75		28 62		135 42		47 42	
Hullett				313 50		54 25		43 35												566 52		47 04		1032 38		27 88	
Turnberry		7 57		197 50		79 15		110 50					18 75							207 76		128 60		771 06		79 06	
Morris				328 75		58 00		65 75													95 90		543 40		119 47		
Wroxeter Horticultural																					31 68		251 08				
HERON, WEST :																											
Colborne		419 60		370 00		395 00		294 78					16 00							93 14		315 10		1933 62		40 16	
Wawanosh, East				134 00		72 75		54 50												142 75		20 00		162 75			
Wawanosh and Ashfield				81 00		47 75		46 00					3 75							178 22		23 37		472 39		25 08	
Goderich Horticultural																								227 90		55 81	
.....																								583 25		162 50	
HERON, SOUTH :																											
Hay		399 08		567 50		169 50		204 75						22 25							497 605		1828 43			0 98	
Stanley				194 50		80 00		71 25												8 00		86 42		462 42		77 22	
Stephen and Usborne		17 21		119 75		69 75		68 75												23 69		52 50		351 40		5 12	
Tuckersmith				107 00																		161 15		971 15		232 15	
.....				258 50		136 00		95 75					16 00							508 84		130 50		1163 34		48 22	

* \$64.60 of Prizes unpaid.

† \$42.00 of Prizes unpaid.

‡ \$199.75 for Spring Show.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—*Continued.*

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurers.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
KINGSTON, E. D.:	418	97	143	00	350	00	...	...	13	13	...	...	...	...	...	...	...	...	925	10	...	...
KENT, EAST:	381	42	227	00	700	00	270	00	338	75	...	...	242	00	...	...	17	00	2176	17	...	...
Harwich	50	53	166	00	112	25	130	00	245	63	...	...	364	64	...	...	369	00	1398	05	...	...
Howard . . . . .	...	...	303	00	157	65	50	00	261	50	...	...	...	...	...	...	66	25	838	40	...	...
Orford	32	35	129	00	59	25	...	...	225	15	...	...	...	...	...	...	44	00	590	85	...	...
Canterbury	116	14	191	00	90	90	...	...	250	00	450	00	...	...	...	...	46	80	1144	84	...	...
KENT, WEST:	758	54	639	00	700	00	330	00	698	98	...	...	...	...	...	...	211	50	3339	02	...	...
Chatham and Dover	144	42	185	00	139	61	25	00	141	55	...	...	...	...	...	...	19	00	654	58	...	...
Raleigh	182	27	89	50	104	06	...	...	...	...	...	...	228	05	...	...	3	00	606	88	...	...
Romney . . . . .	...	...	97	00	...	...	...	...	...	...	...	...	...	...	...	...	13	22	110	22	...	...
Tilbury, East	52	93	89	50	102	85	...	...	12	00	...	...	119	60	...	...	...	...	376	28	...	...
LAMBTON, EAST:	300	19	309	00	700	00	200	00	324	22	...	...	...	...	...	...	11	00	1844	41	...	...
Bosanquet	63	23	188	00	81	60	70	00	85	44	...	...	...	...	...	...	...	...	488	27	...	...
Brooke	115	74	177	50	119	25	...	...	...	...	...	...	...	...	...	...	...	...	412	49	...	...
Euphemia and Dawn	26	86	105	00	66	72	30	00	56	12	...	...	...	...	...	...	...	...	284	70	...	...
Plympton	8	99	246	00	140	00	...	...	104	25	...	...	...	...	...	...	19	80	519	04	...	...
Warwick *	27	95	68	00	...	...	...	...	...	...	...	...	...	...	...	...	...	...	95	95	...	...
LAMBTON, WEST: . . . . .	...	...	152	50	700	00	200	00	191	36	...	...	120	72	340	87	...	...	1705	45	...	...
Enniskillen	148	55	129	00	112	00	...	...	...	...	...	...	...	...	...	...	...	...	389	59	...	...
Moore	107	83	123	00	100	00	25	00	9	54	...	...	...	...	...	...	2	40	366	77	...	...
Sarnia	6	04	458	00	140	00	150	00	224	70	...	...	...	...	...	...	121	46	1100	50	...	...

* United with Electoral District Society.

† United with Electoral District Society.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.	Legislative Grants to Township Societies.	Prizes for Animals.	Prizes for Field, Garden and Dairy Products.	Prizes for Manufactures, Fine Arts and Ladies' Work.	Prizes for Ploughing.	Prizes for previous years paid.	Purchase of Machinery, Stock, Seeds, etc.	Grants to Union Exhibitions.	Buildings and (Grounds, Interest & Insurance.	Working and Miscellaneous Expenses.	Totals of Expenditure.	Balances in hand.
	£	£	£	£	£	£	£	£	£	£	£	£	£
KINGSTON, E. D.	.....	.....	25 50	126 25	65 00	.....	.....	.....	.....	.....	177 11	393 86	531 24
KENT, EAST:													
Harwich	420 00	380 00	380 00	107 55	195 00	.....	59 25	292 00	.....	19 00	85 00	1017 80	558 37
Harwich	.....	141 75	54 25	54 25	52 52	.....	.....	369 83	.....	580 69	126 11	1325 15	72 90
Howard	63 12	208 25	84 00	84 00	81 70	.....	.....	.....	.....	310 58	141 36	889 01	.....
Oxford	.....	103 80	51 65	51 65	30 00	.....	25 95	.....	.....	296 82	76 58	584 80	6 05
Camden	.....	155 67	51 00	51 00	128 93	.....	.....	.....	.....	693 75	123 70	1153 65	.....
KENT, WEST:													
Camden and Dover	313 52	469 50	138 50	138 50	190 25	.....	48 50	494 26	.....	345 29	271 00	2270 82	1068 20
Raleigh	.....	137 30	56 25	56 25	64 50	.....	0 25	.....	.....	135 18	38 62	432 10	292 48
Romney	.....	96 00	34 90	34 90	15 60	.....	.....	191 00	.....	207 20*	31 15	575 85	31 03
Tilbury, East	.....	82 75	41 50	41 50	17 35	.....	.....	62 26	.....	.....	16 30	16 30	93 92
LAMBTON, EAST:													
Bosanquet	.....	417 49	176 10	176 10	247 20	135 00	13 30	.....	.....	522 57	263 60	1777 17	67 24
Brooke	.....	86 50	52 90	52 90	50 10	.....	1 00	.....	.....	281 57	33 10	505 17	.....
Brooke	.....	147 00	30 40	36 85	36 85	.....	.....	.....	.....	5 00	46 53	965 78	146 71
Euphemia and Dawn	.....	131 75	46 85	46 85	63 25	.....	.....	.....	.....	3 86	37 63	286 34	.....
Plympton	.....	189 15	76 90	76 90	65 05	.....	.....	.....	.....	.....	142 83	473 93	45 11
Warwick	.....	.....	.....	.....	.....	.....	.....	.....	68 00	.....	3 00	71 00	24 95
LAMBTON, WEST:													
Enniskillen	270 83	420 00	410 31	150 00	97 20	.....	3 50	.....	.....	283 15	144 39	1779 38	5 15
Moore	.....	136 80	51 85	51 85	7 25	.....	122 40	.....	211 00	9 30	51 00	384 40	.....
Sarnia	.....	197 50	197 50	106 90	89 63	.....	1 25	.....	.....	502 67	133 72	1030 42	67 79
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	69 78

* \$186.00 Loan.

† \$50.00 Loan.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in Hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
LANARK, NORTH:																						
Dalhousie	100	92	449	85	700	00	140	00	568	75	121	00	180	44	150	00	.....	.....	1980	00	.....	.....
Lanark	191	89	77	15	140	00	.....	.....	31	20	60	00	322	96	.....	.....	.....	.....	558	51	.....	.....
Pakenham .....	.....	.....	130	55	140	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	816	00	.....	.....
.....	.....	.....	122	75	140	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	282	75	.....	.....
LANARK, SOUTH:																						
Drummond	149	34	244	50	700	00	100	00	179	90	.....	.....	.....	.....	.....	.....	.....	.....	1224	40	.....	.....
Montague .....	.....	.....	90	50	140	00	.....	.....	.....	.....	.....	.....	5	00	.....	.....	.....	.....	384	84	.....	.....
.....	.....	.....	174	50	140	00	.....	.....	49	00	.....	.....	245	90	.....	.....	.....	.....	659	40	.....	.....
LENNOX:																						
Amherst Island	14	40	249	00	700	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	954	00	.....	.....
Ernestown	32	77	52	00	140	00	10	00	.....	.....	.....	.....	35	50	.....	.....	.....	.....	205	40	.....	.....
.....	.....	.....	59	00	140	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	308	77	.....	.....
LEEDS, SOUTH:																						
Bastard and Crosby	31	51	297	42	700	00	100	00	354	20	.....	.....	.....	.....	.....	.....	.....	.....	1451	62	.....	.....
Lansdown	19	40	100	00	105	00	15	25	67	60	.....	.....	.....	.....	.....	.....	.....	.....	345	86	.....	.....
Crosby, North	19	31	172	05	140	00	20	55	114	35	.....	.....	10	00	.....	.....	.....	.....	476	35	.....	.....
Rear of Leeds and Lansdown .....	.....	.....	76	00	76	00	11	50	2	90	.....	.....	67	00	.....	.....	.....	.....	330	73	.....	.....
.....	.....	.....	135	00	86	00	63	00	76	88	.....	.....	.....	.....	.....	.....	.....	.....	371	88	.....	.....
LEEDS, NORTH, AND GRENVILLE:																						
Elmsley	105	01	142	00	700	00	100	00	207	33	.....	.....	51	00	.....	.....	.....	.....	1350	34	.....	.....
Kitley	6	54	104	50	84	70	.....	.....	72	70	.....	.....	.....	.....	.....	.....	.....	.....	276	96	.....	.....
Oxford	42	12	153	34	153	34	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	404	46	.....	.....
Wolford	9	92	89	00	63	69	68	15	22	10	.....	.....	.....	.....	.....	.....	.....	.....	180	79	.....	.....
.....	.....	.....	128	23	130	10	.....	.....	49	94	.....	.....	.....	.....	.....	.....	.....	.....	305	84	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	42	34	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	21	76	.....	.....

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
LASARK, NORTH:	142	07	420	00	474	50*	148	00	254	00									51	45	284	78	1689	55	300	05
Dalhousie					58	50	39	80	23	60					268	85			75	75	33	34	499	54	58	97
Lanark					67	25	41	70	44	65					330	69			4	85	92	26	641	43	175	20
Pakenham					79	25	70	59	51	27											76	21	277	02		
LASARK, SOUTH:	167	49	280	00	256	75	125	25	126	00									292	00	162	61	1410	95		
Drummond															359	70					15	85	375	35	9	29
Montague	3	50			87	25	81	70	110	50					256	04					100	98	639	97	19	43
LENOX:	65	63	280	00	313	50	68	25	227	01											105	60	1059	89		
Ancherst Island					79	20	25	55	16	00											15	00	139	75	66	55
Ernestown					61	00	19	25	22	85			0	50	136	90			11	00	44	58	296	08	12	69
LEEDS, SOUTH:	17	20	465	00	350	00	138	20	231	50			1	35					50	00	263	76	1517	51		
Bastard and Crosby					120	00	76	00	40	82											64	80	329	87	15	99
Lansdown					85	50	56	18	80	10					32	00			28	15	108	63	476	57		
Crosby, North					96	50	105	75	39	15									86	96	46	30	307	70	23	03
Rem of Leeds and Lansdown	28	32			58	90	45	25	54	00									85	94	69	80	312	21	29	67
LEEDS, NORTH, AND GRESHAM:			456	34	141	00	93	20	76	13			9	76					149	78	292	00	1218	21	132	13
Thursley					55	00	51	50	8	99									61	73	20	75	197	97	78	99
Kitley					140	90	35	10	84	82			1	34					8	90	91	51	362	57	41	89
Oxford					85	00	41	40	41	00									14	05	29	00	223	13		
Wolford					53	82	41	08	17	80			112	70					281	70	53	20	417	60		

* 884.25 deducted.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—*Continued.*

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
LINCOLN:	1	81	603	00	700	00	560	00	758	83	650	00	.....	.....	.....	.....	18	00	3291	61	19	07
Clinton	90	63	223	00	80	25	125	00	103	60	.....	.....	.....	.....	.....	.....	36	00	658	48	75	35
Grantham *	37	79	310	00	139	59	60	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	577	38	.....	.....
Grimsby	3	99	372	50	140	00	150	00	470	65	.....	.....	.....	.....	.....	.....	221	07	1358	21	25	63
Louth	19	58	125	00	43	84	60	00	.....	.....	.....	.....	.....	.....	.....	.....	0	26	248	08	.....	.....
LONDON, E. D.: +	640	43	1099	00	350	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	47	10	2137	03	.....	.....
Western Exhibition	5459	97	712	00	.....	.....	.....	.....	9193	65	.....	.....	.....	.....	1950	00	292	63	17607	35	.....	.....
MINCHESTER, EAST: +	354	03	335	00	700	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	391	36	1783	39	.....	.....
Dorchester, North	13	20	144	00	65	86	40	00	.....	.....	.....	.....	.....	.....	.....	.....	16	00	279	06	14	35
London .....	.....	.....	275	50	140	00	25	00	.....	.....	.....	.....	.....	.....	.....	.....	29	25	469	75	.....	.....
Nissouri, West	27	77	258	50	96	58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	382	85	.....	.....
Westminster	5	85	307	00	117	56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14	25	444	06	.....	.....
MINCHESTER, WEST:	0	37	333	75	700	00	.....	.....	303	73	.....	.....	.....	.....	.....	.....	.....	.....	1337	85	.....	.....
Caraboe	94	44	162	00	66	56	.....	.....	17	49	.....	.....	.....	.....	.....	.....	1	00	341	99	.....	.....
Delaware .....	.....	.....	171	75	79	04	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	31	00	281	79	.....	.....
Elkfrid	8	08	125	75	58	91	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	0	50	133	24	.....	.....
Metcalfe	14	36	142	00	72	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	298	64	.....	.....
Mosa	12	57	154	00	79	56	.....	.....	195	70	.....	.....	.....	.....	.....	.....	.....	.....	442	08	.....	.....
Strathroy Horticultural	9	00	108	00	54	34	.....	.....	113	45	.....	.....	.....	.....	.....	.....	7	00	291	79	.....	.....

* United with Electoral District Society.
 + United with Western Exhibition.

‡ United with Western Exhibition.
 § United with Mosa.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.	Legislative Grants to Township Societies.	Prizes for Animals.	Prizes for Field, Garden, and Dairy Products.	Prizes for Manufactures, Fine Arts, and Ladies' Work.	Prizes for Ploughing.	Prizes for previous years paid.	Purchase of Machinery, Stock, Seeds, etc.	(Grants to Union Exhibitions.	Buildings and Grounds, Interest & Insurance.	Working and Miscellaneous Expenses.	Totals of Expenditure.	Balances in hand.
LANGLIS :													
Clinton		270 15	710 00	333 00	233 00		8 00			1374 56*	381 97	3310 68	
Grantham			255 00	81 75	81 25					241 43	73 15	733 83	
Grimshy			374 80	118 15	94 85				539 59	614 14	181 90	1383 84	37 79
Louth			117 50	34 50	34 00					2 00	37 45	225 45	23 23
LONDON, E. D. :									1200 00		166 86	1366 86	770 17
Western Exhibition			3735 00	1491 00	2266 50					1244 46	2981 13	11718 09	5889 26
MIDDLESEX, EAST :									750 00		611 50	1781 50	1 89
Dorchester, North		420 00	138 50	37 00	92 50					57 60	37 81	293 41	
London	0 06		250 50	14 75	27 75						41 00	334 06	135 69
Nissouri, West			156 00	75 00	96 00						31 00	358 00	24 85
Westminster			314 25	24 75	49 50						51 60	440 10	4 56
MIDDLESEX, WEST :											232 06	1313 59	24 26
Caridoc		410 67	370 85	88 30	115 10		21 00			75 61	66 33	291 23	50 76
Delaware	19 20		188 30†	53 25	42 50					6 00	36 55	227 75	54 04
Ekfrid			106 25	50 60	15 75						44 10	170 10	23 11
Meckale			126 00§									194 00	34 64
Mesa			98 95	35 45	17 35						42 25	141 96	30 12
Strathroy Horticultural			93 00	40 00	55 00					193 36	30 60	411 96	38 03
				82 80						67 15	103 80	253 76	

* \$594.05 of Prizes unpaid.
 † Total, not returned in classes.

† \$929.06 Note and interest.
 ‡ \$180.00 Legal expenses.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—*Continued.*

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
MURDOUX, North :																						
Adelaide.			80 00		700 00				472 68						635 00				1917 68			
Birdolph			92 45		26 00												5 00		123 45			
Labo *			205 00		75 90														350 12			
McGillivray.			235 00		87 00														922 00			
Williams, East +			73 25		24 95												12 96		122 36			
Williams, West			272 00		101 00														373 00			
			300 20		105 00				49 50										533 27			
MONK :																						
Canboro			263 50		700 00				358 00										1327 50			
Calabar			60 75		45 00				9 00								1 50		174 01			
Calabar			67 00		51 40												0 75		176 81			
Gainsboro			60 00		53 55				13 49										177 04			
Pellam			109 00		85 00						50 00								315 18			
Montion and Shetbrook			219 50		140 00				78 35										536 55			
Wainfleet			50 00		42 00												8 50		111 17			
MUSKOKA :																						
Foley			117 50		700 00				52 15								41 05		1048 39			
Humphrey and Caldwell			71 50		57 78				2 30										134 58			
Morrison and Ryde			59 00		51 51														112 01			
Stephenson			54 50		56 71				7 00										115 02			
McKellar and Hagerman			73 00		54 57												6 00		139 17			
McDougall and Carling			60 00		64 20				2 85								13 95		141 00			
McLean and Ridout			54 00		71 69				5 98										111 67			
Watt			34 00		57 78				2 10								5 00		44 47			
			54 00														5 45		130 69			

* United with Electoral District Society.

+ United with Electoral District Society.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden, and Poultry Products.		Prizes for Manufactures, Fine Arts, and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢	£	¢
MIDDLESEX, NORTH:																										
Adelaide	19 21	420 00	534 00	168 00	230 10	60 00															449 97	1881 28	66 40			
Biddulph			109 55		29 25																33 66	143 21	96 51			
Labou			171 95	22 50												235 00					57 00	322 00	0 76			
McGillivray			71 00	19 00	18 00																13 60	121 60				
Williams, East																										
Williams, West			199 50	42 00	82 50						24 75				373 00		96 75		68 75	514 25						
MOYOK:																										
Canboro'		420 00	309 33	101 69	118 60													180 55		168 66	1317 06	10 44				
Casslor			98 20	33 40	16 10													8 45		7 00	163 15	10 86				
Gainsboro'			82 50	17 65	24 75													7 00		26 51	157 81	19 00				
Pellam			85 55	18 90	34 55													10 00		25 80	174 80	2 24				
Monlton and Sherbrook			157 81	48 06	37 05						29 84							33 67		29 87	336 33	8 85				
Wainfleet	7 00		233 00	78 00	115 25															80 25	506 50	30 15				
			96 52	16 15																8 97	128 64					
MUSKOKA:																										
Foley		417 30	159 25	102 00	55 75													30 30		105 95	870 55	177 84				
Humphrey and Cardwell		41 75	28 75	10 75														4 00		21 42	106 67	27 91				
Morrison and Ryde			56 00	28 75	15 50													4 31		14 78	119 33	22 71				
Stephenson			29 75	24 05	13 70															23 59	141 09	3 93				
McDonnell and Carling			32 50	37 60	12 00													4 19		19 75	116 47	22 70				
McLean and Ridout			43 50	37 00	18 59						10 50							9 70		18 10	137 30	4 37				
McKellar and Hagerman			14 70	14 65	6 10													1 25		6 16	42 86	1 61				
Watt	7 05		57 69	30 25	15 25						2 50							6 10		24 41	140 66	0 94				
			58 00	42 75	9 50															12 51	125 26	5 43				

* Total, not returned classified.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admis- sions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
NIAGARA, E. D.:	89	01	132	00	350	00	130	00	31	25							10	00	742	26		
NORFOLK, NORTH:	404	81	370	50	700	00			1155	40									2750	71		
Middleton	128	08	215	00	133	25	20	74	97	00					200	00	28	00	620	07		
Townsend	98	46	253	70	138	45			303	37	42	00					5	00	812	98		
Windham	54	74	137	00	84	50			47	06									323	30		
Simcoe Horticultural			127	00	62	40			6	30									195	70		
NORFOLK, SOUTH:	725	98	158	50	700	00											34	29	1618	77		
Charlotteville	41	31	104	00	100	00	70	50											315	81		
Houghton			59	00	55	76													114	76		
Walsingham	56	91	187	00	140	06			94	32							89	00	567	23		
Woodhouse	31	21	80	00	80	00													191	21		
NORTHUMBERLAND, EAST:	7	46	85	00	700	00			20	00							23	86	817	51	18	81
Brighton	54	71	72	00															126	71		
Cramahe	13	93	122	00	111	60			30	15									277	68	30	62
Murray	24	35	106	00	93	00													219	35	5	12
Percy	75	88	121	50	100	44			181	16									478	98		
Seymour	48	21	56	00	47	43			12	25									163	89		

* United with North Electoral District Society for Exhibition.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts, and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
NIAGARA, E. D.:					219 00		297 00		62 40										32 94		104 25		655 59		86 67	
NORFOLK, NORTH:			418 60		622 50		227 15		179 05										284 74		460 05		2192 09		568 62	
Middleton					171 50		68 55		72 64										65 36		76 91		454 96		165 11	
Townsend					217 85		73 35		87 03										264 60		108 60		781 43		61 55	
Windham					113 25		58 50		25 00										32 00		24 35		253 10		70 20	
Sturges Horticultural							76 80						2 00						15 00		29 42		191 05		4 65	
NORFOLK, SOUTH:			376 00																		107 29		721 33		897 44	
Charlottesville					119 46		60 05		20 85										9 00				250 32		65 49	
Houghton					47 85		17 70		7 95														101 35		13 41	
Walsingham					150 50		49 55		35 35										223 38		43 50		502 28		64 95	
Woodhouse					110 26		38 14		12 50												18 65		179 19		12 02	
NORTHUMBERLAND, EAST:			352 47		219 05		85 95		116 50				2 00								60 35		836 32			
Brighton																							13 00		113 71	
Granby					97 80		31 90		52 60										11 25		114 75		308 30			
Murray					110 80		48 66		48 92												46 00		254 47			
Percy					138 45		46 50		62 34										31 75		79 65		358 69		120 29	
Seymour					40 25		21 15		11 75										10 00		54 40		137 55		26 34	

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
NORTHUMBERLAND, WEST :																						
Alwyck	165	52	212	50	700	00	.....	.....	485	17	.....	.....	.....	.....	190	00	42	25	1755	44	.....	.....
.....	29	50	53	00	111	27	.....	.....	90	25	.....	.....	.....	.....	.....	.....	.....	.....	284	02	.....	.....
.....	41	53	62	00	115	45	.....	.....	60	38	.....	.....	.....	.....	.....	.....	119	20	308	56	.....	.....
.....	20	07	97	00	140	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	25	263	92	.....	.....
ONTARIO, NORTH :																						
.....	180	54	346	00	700	00	.....	.....	496	97	.....	.....	.....	.....	.....	.....	.....	.....	1723	51	.....	.....
.....	40	20	151	00	93	27	.....	.....	93	52	.....	.....	.....	.....	.....	.....	.....	.....	451	99	.....	7 28
.....	.....	.....	106	00	73	25	.....	.....	.....	.....	67	00	.....	.....	.....	.....	.....	.....	246	20	.....	.....
.....	55	11	102	00	71	90	.....	.....	36	73	.....	.....	.....	.....	.....	.....	6	75	272	49	.....	.....
.....	9	41	95	50	56	98	.....	.....	2	00	.....	.....	.....	.....	.....	.....	12	81	176	70	.....	3 10
.....	30	85	247	25	124	40	.....	.....	115	12	.....	.....	.....	.....	.....	.....	21	50	539	12	.....	.....
ONTARIO, SOUTH :																						
.....	71	27	743	00	700	00	.....	.....	1003	17	.....	.....	.....	.....	.....	.....	59	75	2577	19	.....	.....
.....	.....	.....	201	00	140	00	.....	.....	484	79	.....	.....	.....	.....	.....	.....	.....	.....	825	79	.....	11 41
.....	78	53	.....	.....	140	00	.....	.....	187	55	.....	.....	.....	.....	.....	.....	60	75	705	32	.....	.....
OTTAWA, E. D. :																						
.....	.....	.....	264	42	350	00	.....	1700	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	2314	42	.....	174 61
OXFORD, NORTH :																						
.....	149	91	562	00	700	00	.....	.....	674	17	.....	.....	.....	.....	221	10	.....	.....	2307	18	.....	.....
.....	.....	.....	140	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	221	10	.....	.....
.....	.....	.....	322	50	140	00	.....	.....	237	25	.....	.....	.....	.....	.....	.....	339	60	1039	35	.....	.....
.....	42	35	126	00	75	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	243	06	.....	.....
.....	32	79	124	50	48	52	.....	.....	22	75	.....	.....	.....	.....	118	00	40	00	406	56	.....	.....
.....	36	21	142	50	73	57	.....	.....	23	25	.....	.....	.....	.....	.....	.....	.....	.....	305	53	.....	.....

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts, and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.		
	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	
NORTHERLAND, WEST:																											
Alnwick	366	92			301	00	181	00	164	75							121	33	507	32*	145	68	1791	00	4	44	
Halldimand					90	00	37	45	41	41									26	77	36	55	232	18	51	84	
Hamilton†					99	25		51	75	10	00										44	07	235	07	163	49	
								30	00								190	00			27	35	247	35	16	57	
ONTARIO, NORTH:																											
Brook	420	00	337	00†	144	00	265	75	265	75			38	25					78	00	201	94	1475	69	247	82	
Reach and Sebring					156	00	81	00	140	75									4	00	77	52	429	27			
Thorah					109	00			28	50			33	50							38	00	190	98	55	22	
Mara and Rama					66	35	34	05	31	75									22	00	45	75	200	75	71	74	
Uxbridge					80	00	36	75	12	50									6	70	34	85	179	80			
					126	75		52	25	73	25		65	00							92	18	309	43	129	69	
ONTARIO, SOUTH:																											
Pickering	280	00	744	50	433	50	478	75	478	75			21	00					202	63	374	61	2534	99	42	20	
Whitby and East Whitby			339	00	149	00	175	50	175	50											174	00	837	20			
			300	75			106	50	128	75											95	30	631	30	74	03	
OTTAWA, E. D.:																											
Oxford, North	418	50	963	25			213	75	128	50									2017	73	247	57	2489	03			
Blandford			325	50	133	00	107	50	107	50									137	54	320	14	2238	68	68	50	
Blenheim	14	78			20	25	22	25	22	25			72	50					65	71	237	82	1008	81	30	54	
Nissouri, East			137	00	29	25	62	75	50	00			19	75					5	00	30	75	245	25	28	41	
Zorra, East			166	25			52	75	39	00									19	00	69	00	386	75	19	81	
Zorra, West, and Embro			80	50	52	75			39	00			10	00					6	50	38	79	236	54	68	99	

* \$200.00 Note and interest.

† United with Electoral District Society for Exhibition.

* \$80.25 unpaid.

† \$381.50 unpaid.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
Oxford, South :			226	10	700	00									608	05	478	14	2012	19		
Dereham :	9	50	274	00	59	78			201	19							96	50	544	47		
Norwich, North *	1	26	465	00	157	30			276	22							108	75	996	18		
Norwich, South :	104	09	397	50	103	75			374	50							20	00	1088	59		
Oxford, East :	87	45	117	00	38	75													263	20		
PREF. :																						
Toronto :	56	57	470	00	700	00	400	00	1370	63							131	41	3128	61		22
	606	81	172	30	140	00	100	00	247	20							48	00	1314	31		65
PERRIE, NORTH :																						
Elma :	289	05	392	00	700	00	150	00	773	55			140	50					2445	10		
Logan :	48	96	121	00	118	00	20	00	23	20			12	15			2	50	345	81		
Wallace and Elma :	52	71	88	50	89	00	15	00	11	05							5	26	261	52		
Stratford Horticultural :	11	86	165	00	162	00	100	00	390	25							33	00	862	11		
	337	71	128	00	141	00	8	00	63	00							5	00	682	71		
PERRIE, SOUTH :																						
Blanshard :	0	83	316	00	700	00	302	00	638	30	100	00							2057	13		
Kellarton :	157	87	143	00	104	54	67	36	40	90							11	12	574	79		
Hillbert :	3	40	91	50	70	11			26	00									194	01		
Easthope, South +	79	15	131	00	95	94	20	00	70	25									396	34		
Mitchell Horticultural :			73	00	50	92	10	00											133	92		
St. Mary's Horticultural :	45	88	171	00	126	94	100	00											397	94		10
	50	00	54	00	39	85	25	00											168	85		23

* United with Electoral District Society for Exhibition.

+ United with East Zorra for Exhibition.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative (Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts, and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchases of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s
OXFORD, SOUTH :	0	67	420	00	745	70	172	80	114	45	.....	.....	1	75	.....	.....	.....	.....	120	00	540	15	1995	92	16	67
Dorchester	191	00	57	25	43	00	.....	.....	3	50	.....	.....	490	55	287	09	311	79	1092	93	4	94
Norwich, North	408	75	131	50	150	25	.....	.....	30	75	.....	.....	149	75	30	64	157	78	918	67	169	92
Norwich, South	1	60	.....	.....	.....	.....	.....	.....	21	75	172	50	90	70
Oxford, East *
PERKINS	140	00	868	00	507	00	569	50	.....	.....	47	50	.....	.....	.....	.....	327	02	692	21	3151	26	.....	.....
Toronto	349	50†	93	50	91	00	.....	.....	.....	.....	.....	.....	.....	.....	89	62	121	82	750	91	563	37
PERTH, NORTH :	510	00	305	50	340	00	187	00	.....	.....	46	50	.....	.....	.....	.....	458	91	359	09	2907	63	237	47
Elma	92	75	47	25	22	25	.....	.....	34	50	.....	.....	.....	.....	.....	.....	99	30	295	95	49	86
Levan	118	75	44	00	24	25	.....	.....	15	75	.....	.....	.....	.....	2	25	37	60	242	60	18	92
Wallace and Elma	342	96	217	00	136	75	.....	.....	9	75	.....	.....	30	00	.....	.....	136	50	842	96	19	15
Stratford Horticultural	75	75	.....	.....	.....	.....	13	00	.....	.....	.....	.....	.....	.....	76	80	215	96	464	75
PERTH, SOUTH :	510	00	291	90	58	65	181	60	.....	.....	130	00	.....	.....	.....	.....	381	07	279	06	1935	28	121	85
Blanshard	148	75	37	75	79	50	.....	.....	126	25	.....	.....	.....	.....	16	25	66	09	474	59	100	20
Fulford	93	75	29	00	21	50	.....	.....	25	35	.....	.....	.....	.....	.....	.....	25	39	181	89	12	12
Hilbert	123	05†	38	45	41	25	.....	.....	101	99	.....	.....	118	00	42	35	73	80	370	75	25	39
Easthope, South
Mitchell Horticultural	23	50§	117	25	53	50	.....	.....	.....	.....	.....	.....	.....	.....	130	10	83	82	408	17	15	92
St. Mary's Horticultural	72	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	65	93	137	93	30	92

* United with Electoral District Society for Exhibition.

† \$30.05 not paid.

† \$150.00 paid in addition for Special Prizes from individuals.

§ For Poultry.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
PETERBORO', EAST :—	44	52	81	00	700	00	...	...	88	38	...	...	...	...	100	00	...	...	1013	90	46	15
Asphodel and Belmont	5	30	46	00	83	77	30	00	68	97	...	...	...	...	...	...	...	...	234	04	...	...
Dummer and Douro *	55	89	72	00	86	18	...	...	4	00	...	...	...	...	...	...	...	...	218	07	...	...
Galway	34	15	34	00	36	42	...	...	9	85	...	...	...	...	...	...	...	...	114	42	...	...
Burleigh	66	85	69	00	84	98	...	...	7	30	...	...	...	...	...	...	...	...	228	33	...	...
Otonabee	57	21	148	00	128	65	...	...	64	26	...	...	...	...	...	...	1	25	339	37	...	...
PETERBORO', WEST :—	150	56	97	00	700	00	...	...	288	45	...	...	...	...	...	...	11	00	1247	01	...	...
Smith and Ennismore	180	72	91	00	140	00	...	...	51	80	...	...	...	...	...	...	7	57	471	09	...	...
Monaghan, South	26	05	59	00	140	00	...	...	19	27	...	...	...	...	...	...	...	...	244	32	...	...
Peterboro' Horticultural	173	11	64	00	140	00	...	...	6	58	...	...	...	...	...	...	...	...	383	69	...	...
PRESGOTT :—	9	71	83	00	700	00	...	...	79	00	...	...	...	...	350	26	...	...	1527	97	31	42
Caledonia	...	...	128	00	128	00	...	...	...	...	...	...	...	...	...	...	...	...	256	00	...	...
Longueuil and Hawkesbury	...	...	190	00	190	00	...	...	...	...	...	...	...	...	...	...	...	...	380	00	...	...
Plantagenet, South	15	35	104	00	102	00	...	...	...	...	...	...	...	...	...	...	...	...	221	35	...	...
PRINCE EDWARD :—	206	13	155	00	760	60	...	...	385	86	...	...	...	...	...	...	22	50	1470	49	...	...
Ameliasburgh	...	...	192	00	140	00	...	...	270	00	...	...	...	...	...	...	2	00	604	00	41	64
Hallowell	19	04	55	00	58	20	...	...	11	50	...	...	...	...	...	...	...	...	143	74	...	...
Hillier	0	40	57	00	63	68	...	...	8	50	...	...	...	...	...	...	...	...	128	58	...	...
Narysburg, South	...	...	80	00	87	75	...	...	35	75	...	...	...	...	...	...	...	...	203	50	...	...
Sophtasburgh	...	...	67	50	70	27	...	...	18	75	...	...	...	...	...	...	4	00	160	52	17	52

* United with Electoral District Society for Exhibition.

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Legislative Grants to		Prizes for Animals.		Prizes for Field, Garden, and Dairy Products.		Prizes for Manufactures, Fine Arts, and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s	£	s
PETERBORO', EAST:	420 00		225 50*		116 15		86 60				8 25				96 15		25 00		120 65		1060 05		3 21	
Asphodel and Belmont			76 65†		59 35		37 00												41 38		230 83		78 13	
Donner and Douro																			39 94		139 94		26 88	
Galway			30 50		24 20		13 45												15 39		87 54		129 63	
Barleigh			66 00		37 50		11 00				39 80								70 97		228 33			
Otonabee			102 00		41 15		25 45				4 00		50 00				0 55		47 19		270 34			
PETERBORO', WEST:	420 00		277 00		74 00		96 75				15 75				50 00		14 50		109 92		1058 07		208 94	
Smith and Emsmore			119 75		60 25		81 75										18 18		51 45		331 38		139 71	
Monaghan, South	29 57		104 00		59 00		32 75												83 68		244 32		164 36	
Peterboro' Horticultural					135 65																219 33			
PURSCOTT:	420 00		185 00		67 50		85 00										719 40		82 49		1259 39			
Caledonia			244 00†																12 00		256 00			
Longueuil and Hawkesbury	1 74				64 25		23 60								356 25				22 00		380 00			
Plantagenet			76 45																44 25		208 55		12 80	
PRINCE EDWARD:	420 00		283 91		66 80		86 25				21 25						172 93		77 61		1145 30		325 19	
Ameliasburgh			176 20		68 40		53 25										122 45		189 33		645 64			
Hallowell		36 01	44 10		31 95		15 90										6 00		21 00		118 95		24 79	
Hillier					45 25		17 85										1 08		16 05		119 68		10 50	
Marysburgh, South		14 22	65 59		32 65		53 86												35 78		162 10		1 40	
Sophiasburgh			87 40		29 75		25 80				3 50						1 50		27 09		178 04			

* \$13.25 unpaid.

† 88.55 unpaid.

§ United with Electoral District Society for Exhibition.

+ Total Prizes, not classified.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c	\$	c	\$	c	\$	c	\$	c	\$	c	\$	c	\$	c	\$	c	\$	c	\$	c
REXFREW, NORTH:	74	23	134	00	700	00	.....	.....	123	50	.....	.....	.....	.....	.....	.....	.....	.....	1031	73	.....	.....
	.....	.....	60	00	67	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	127	00	8	50
	.....	.....	298	80	140	00	.....	.....	136	15	.....	.....	.....	.....	.....	.....	20	00	594	95	56	00

REXFREW, SOUTH:	10	08	132	50	700	00	.....	.....	290	80	.....	.....	.....	.....	.....	.....	63	25	1196	63	.....	.....
	.....	.....	85	37	89	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	00	189	37	.....	.....
	.....	.....	123	50	103	00	.....	.....	4	20	.....	.....	.....	.....	.....	.....	.....	.....	230	70	.....	.....
	85	50	64	30	63	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	50	220	30	.....	.....
RUSSELL:	.....	.....	191	50	138	00	.....	.....	79	60	.....	.....	.....	.....	.....	.....	.....	.....	509	10	302	38
	.....	.....	81	00	700	00	.....	.....	37	75	.....	.....	.....	.....	.....	.....	.....	.....	818	75	0	95
	21	09	80	00	64	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	105	09	.....	.....
	10	13	54	00	36	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35	00	135	13	.....	.....
SIMCOE, EAST:	29	39	152	00	125	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	311	89	2	51
	.....	.....	192	00	140	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	352	50	.....	.....

TINY AND TAY:	.....	.....	407	25	700	00	.....	.....	253	08	315	00	.....	.....	.....	.....	147	88	2033	21	.....	.....
	.....	.....	52	00	140	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	238	37	.....	.....
	.....	.....	134	50	140	00	.....	.....	12	65	.....	.....	.....	.....	.....	.....	89	35	376	50	42	93
	71	45	112	00	140	00	.....	.....	16	25	.....	.....	.....	.....	.....	.....	4	00	383	70	.....	.....

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts, and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchase of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and (Founds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.	£	c.
RENFREW, NORTH:																										
Grafton and Wilberforce			320 00	145 50	49 60	48 25	73 00	21 00	139 12																	
Pembroke and Staffa				97 25*		48 50	77 25																			
RENFREW, SOUTH:																										
Admaston			420 00	192 50†		80 50	93 75																			
Brudenell and Lyndoch				52 20†		23 60	34 80																			
McNab				50 25		20 85	27 75																			
Amprior Horticultural				74 75‡		76 50	41 35																			
				147 50		62 25	44 00																			
RUSSELL:																										
Clarence			386 00	190 40		62 15	34 10																			
Gloucester				63 60		59 40	7 49																			
Osgoode				54 80		31 75																				
Russell				157 00		94 00	55 00																			
SIMCOE, EAST:																										
Medonte			420 00	553 00		178 00	89 00																			
Oro				92 50		33 00	14 75																			
Thy and Tay				101 00		66 75																				
				143 25		76 25	42 25																			

* \$83.50 unpaid.

† \$33.50 retained.

‡ \$208.19 retained.

§ \$42.00 retained.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—*Continued.*

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
SIMCOE, WEST:	67	36	306	00	700	00	50	00	247	85	.....	.....	.....	.....	.....	.....	61	60	1432	81	.....	.....
Nottawasaga	145	79	284	70	140	00	40	00	165	46	.....	.....	.....	.....	.....	.....	5	10	781	05	.....	.....
Vespra	101	65	111	00	140	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	352	65	.....	.....
Barrie Horticultural	16	76	59	00	140	00	25	00	60	90	.....	.....	.....	.....	.....	.....	.....	.....	301	66	.....	.....
SIMCOE, SOUTH:	43	96	1284	00	700	00	.....	.....	313	34	.....	.....	.....	.....	.....	.....	.....	.....	2241	30	.....	.....
Essa	.....	.....	28	70	140	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	168	70	.....	.....
Gwillimbury, West	.....	.....	284	00	115	25	.....	.....	297	11	.....	.....	.....	.....	.....	.....	.....	.....	606	31	.....	.....
Innisfil	7	93	62	00	31	20	.....	.....	11	05	.....	.....	.....	.....	.....	.....	.....	.....	136	18	.....	.....
Toronto	16	26	133	00	86	00	.....	.....	188	80	.....	.....	.....	.....	.....	.....	.....	.....	424	06	.....	.....
STORMONT:	183	07	173	00	700	00	.....	.....	171	20	.....	.....	.....	.....	.....	.....	.....	.....	1247	27	.....	.....
Finch	.....	.....	19	45	127	00	.....	.....	97	00	.....	.....	.....	.....	.....	.....	.....	.....	243	45	.....	.....
Osaburck	.....	.....	123	50	140	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	263	50	.....	.....
Roxburgh	.....	.....	101	00	137	40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	238	40	.....	.....
TORONTO, E. D.:	260	87	341	00	550	00	.....	.....	295	75	.....	.....	.....	.....	.....	.....	.....	.....	1447	62	.....	.....
VICTORIA, NORTH:	227	05	151	00	700	00	200	00	43	40	.....	.....	.....	.....	.....	.....	.....	.....	1322	45	.....	.....
Bexley and Garden	10	03	57	00	49	00	.....	.....	11	65	.....	.....	.....	.....	.....	.....	.....	.....	127	68	.....	.....
Eldon	110	17	141	00	120	50	.....	.....	61	46	.....	.....	.....	.....	.....	.....	.....	.....	458	13	.....	.....
Laxton and Digby	.....	.....	56	00	48	00	.....	.....	8	58	.....	.....	.....	.....	.....	.....	.....	.....	123	40	.....	.....
Summerville	88	49	148	00	126	54	.....	.....	.....	.....	100	00	.....	.....	.....	.....	.....	.....	475	08	.....	.....

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts, and Ladies' Work.		Prizes for Ploughing.	Prizes for previous years paid.		Purchases of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Circuits, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	£	s	£	s	£	s	£	s	£	s	£	£	s	£	s	£	s	£	s	£	s	£	s
SIMCOE, WEST : Nottawasaga Vespra Barrie Horticultural	420 00		454 00		216 00		105 00			5 00						31 20		183 40		1414 60		18 21	
			460 00*		189 00		185 00											227 12		836 87			
			169 00		41 00		40 75					10 00				8 00		29 00		247 75		104 90	
					111 00											19 50				216 56		86 06	
SIMCOE, SOUTH : Essa + Gwillimbury, West Innisfil Toscoronto	420 00		600 00		337 00		362 35			110 00				161 00		100 00		185 00		2114 35		225 95	
			261 00		92 50		163 50			3 50						2 00		5 70		168 70			
			65 00		39 75		27 25									64 24		27 50		710 12			
			130 75		115 50		129 00									53 75		5 50		137 50			
																		66 77		495 77			
STORMONT : Finch Osnabrock Roxburgh	404 40		297 75		110 00		148 00									8 00		222 89		1191 04		56 23	
			110 75		53 50		52 15									1 00		38 20		255 70			
			127 50		38 50		60 75											30 00		261 61		1 89	
			67 50		39 50		39 75		14 00									17 71		178 46		59 94	
TORONTO, E. D. :					217 75									123 35+				359 60		735 05		712 57	
VICTORIA, NORTH : Rexley and Carden Elton Laxton and Digby Summerville	420 00		149 25		90 25		49 00			27 50				60 50		319 86		173 01		1289 41		33 04	
			44 40		37 50		9 50			10 75								30 00		132 15			
			97 90		45 70		35 50			11 75						166 30		67 73		424 88		33 25	
			48 05		19 30		27 20									2 10		18 85		115 50		7 90	
			74 80		50 35		29 90			15 40						168 32		47 10		366 52		108 56	

* \$224.25 not paid.
+ United with Electoral District Society.
+ Horticultural Society, half proceeds of entrance.
% \$49.35 unpaid.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—Continued.

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
VICTORIA, SOUTH :																						
Emily	283	85	201	00	700	00	200	00	341	00							15	00	1740	85		
Mariposa	10	54	129	00	140	00			26	89									306	34		
Ops	40	32	183	00	140	00			135	01									505	33		
Vernam	0	12	25	00	41	18													65	30		
	46	05	60	00	98	82			26	75			75	14					306	77		
WATERLOO, NORTH :																						
Wellesley	320	38	243	00	700	00	225	00	338	60									1813	31		
Woolwich	80	40	336	58	140	00	40	00	17	72									614	70		
Berlin Horticultural			68	00	140	00	23	00					122	50					446	50		
	8	12			78	17	25	00	21	60									200	89		
WATERLOO, SOUTH :																						
Wilnot	236	14	369	00	700	00	235	00	665	45									2205	59		
Preston Horticultural	160	09	261	09	140	00	110	00	230	55									1039	14		
	195	37	87	00	140	00	30	00	100	60									503	88		
WELLAND :																						
Bertie	450	22	261	00	700	00	77	00	528	00									2016	22		
Humberstone			102	00	91	83													133	83		
Stanford	0	62	73	00	65	72	10	00											11	40		
Thorold	29	59	139	00	111	16	40	00											321	75		
Willoughby	49	15	122	50	103	08	50	00	18	50									1	00		
	1	46	61	66	47	72													344	24		
																			114	84		

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.	Legislative Grants to Township Societies.	Prizes for Animals.	Prizes for Field, Garden and Dairy Products.	Prizes for Manufactures, Fine Arts, and Ladies' Work.	Prizes for Ploughing.	Prizes for previous years paid.	Purchase of Machinery, Stock, Seeds, etc.	Grants to Union Exhibitions.	Buildings and Grounds, Interest & Insurance.	Working and Miscellaneous Expenses.	Totals of Expenditure.	Balances in hand.
	£	£	£	£	£	£	£	£	£	£	£	£	£
VICTORIA, SOUTH:													
Early		420 00	320 75	117 50	73 00		2 00		50 00	406 64	153 67	1513 56	197 29
Mariposa			86 25	52 50	69 00		1 00			15 15	54 32	278 22	28 12
Ops			180 00	81 80	79 95				40 00	34 00	99 10	477 86	27 47
Verulam			68 25	39 00	22 50			94 63		3 41	20 70	60 70	5 60
WATERLOO, NORTH:													
Wellington		358 17	507 50	230 50	159 00						406 64	1721 81	91 50
Wellesley			201 50	138 75	31 75						91 75	466 75	147 95
Woodwich	64 49		215 50	99 50	69 00						48 72	497 21	
Berlin Horticultural				119 50	11 75					10 97	57 36	139 58	1 31
WATERLOO, SOUTH:													
Wilmot		280 00	600 00	204 10	120 00				30 00	80 00	441 39	1755 99	449 60
Preston Horticultural			297 50	131 75	161 00					172 58	129 19	892 02	177 12
WELLAND:													
Bertie		420 00	513 00	121 67	178 51					400 00	157 12	1820 30	195 92
Humberstone	9 09		101 65	31 40	36 50						34 16	202 80	
Stanford			75 57	27 54	31 84						25 79	160 74	
Thorold			173 40	31 50	21 05						41 87	297 82	53 93
Willoughby			183 36	49 45	41 00						46 48	320 29	23 95
			74 00	16 39	7 82						13 70	111 91	2 93

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—*Continued.*

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies, For Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%	£	%
WELLINGTON, CENTRE:																						
Edin	6 99		167 00		700 00		...		115 64						50 00		4 20		1043 82		...	
Garadaxa, West	100 60		432 00		169 18		35 00		28 75								5 00		1148 52		...	
Luther	0 20		133 50		67 85		...		7 00								13 00		235 10		...	
Nichol	5 65		52 00		34 88		20 00		...								...		127 08		...	
Flora Horticultural .....	...		85 00		...		...		16 60								...		190 65		...	
Fergus Horticultural	20 33		84 00		55 28		...		46 25								13 00		155 88		...	
			88 75		37 92		...										...		226 25		...	
WELLINGTON, SOUTH:																						
Erasmosa	18 11		879 56		700 00		...		735 81		2640 00						5 00		5015 37		...	
Poslind	64 65		293 65		125 00		...		89 87								5 08		705 48		...	
Guelph Horticultural	33 10		103 75		52 00		...		20 60								19 50		487 78		...	
																	...		228 45		...	
WELLINGTON, WEST:																						
Arthur	234 03		110 50		700 00		...		42 00		74 00						84 75		1160 33		...	
Minto	17 32		167 00		76 80		...		27 60								...		373 47		...	
Peel and Maryburgh .....	...		120 00		58 08		...		236 90								15 75		414 48		...	
Mount Forest Horticultural	118 62		242 00		115 20		50 00		314 93				40 70				95 60		474 41		69 05	
Palmerston Horticultural			160 00		72 00		30 00		52 13								...		977 05		...	
																	...		314 13		...	
WESTWORTH, NORTH: *																						
Beverly	293 89		130 00		700 00		...		159 22								13 19		1227 08		...	
Flamboro', East	86 40		455 70		135 00		40 00		23 70								2 78		879 10		...	
Flamboro', West	44 76		239 00		112 00		50 00		93 70								...		469 46		...	
	12 94		390 00		140 00		25 60		51 34								6 47		625 75		...	

* United with Provincial Exhibition.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies. — *Continued.*

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.	Legislative Grants to Township Societies.	Prizes for Animals.	Prizes for Field, Garden and Dairy Products.	Prizes for Manufactures, Fine Arts, and Ladies Work.	Prizes for Ploughing.	Prizes for previous years paid.	Purchase of Machinery, Stock, Seeds, etc.	Grants to Union Exhibitions.	Buildings and Grounds, Interest & Insurance.	Working and Miscellaneous Expenses.	Totals of Expenditure.	Balances in hand.
	\$	§ c.	§ c.	§ c.	§ c.	§ c.	§ c.	§ c.	§ c.	§ c.	§ c.	§ c.	§ c.
WELLINGTON, CENTRE:													
Erin		385 11	211 50	103 00	95 50		43 00			22 97	128 81	989 99	53 94
Garafaxa, West	0 30		291 00	136 50	154 83					235 62	170 00	977 95	170 57
Luther			52 50	50 75	37 00		5 00			2 48	23 11	171 22	63 88
Nichol *			57 50	33 50	21 50						12 83	126 33	0 75
Flora Horticultural				99 15					50 00		10 00	60 00	30 65
Fergus Horticultural				128 50							33 60	132 75	23 13
											41 58	170 08	56 17
WELLINGTON, SOUTH:													
Erin	365 93	280 00	448 50†	268 00	116 50		46 50				3509 80	4963 23	52 14
Erin			168 85	98 15	54 50					304 76	74 94	701 20	4 28
Erin			176 50	73 50	30 00						100 64	380 61	107 14
Erin				159 75							62 48	222 23	6 22
WELLINGTON, WEST:													
Arthur		420 00	164 75†	87 50	101 75		24 00			67 00	288 50	1105 00	55 53
Arthur			119 00	76 25	57 75		7 00			4 40	60 67	325 07	48 40
Erin			93 50§	58 95	62 40		21 62			78 00	82 52	394 23	20 75
Erin	55 00						90 50			67 50	87 50	543 52	
Erin			135 00	148 75	71 00			42 00		392 05	148 25	937 05	40 00
Erin			48 00	67 00	31 00						65 93	214 93	99 20
WENTWORTH, NORTH:													
Beverly		387 00	280 50	171 75	111 25				117 00		39 74	543 74	583 34
Flamboro', East			178 00	124 50	37 00		8 00			49 75	134 44	755 70	123 40
Flamboro', West			230 75	110 50	39 25					12 00	107 07	458 57	10 89
										55 00	60 27	555 77	69 98

† \$48.50 unpaid.
§ \$11.80 unpaid.

* United with Electoral District Society for Exhibition.
† \$62.00 Prizes unpaid.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—*Concluded.*

RECEIPTS FOR THE YEAR 1880.

SOCIETIES.	Balances in hand.		Subscriptions and Donations.		Legislative Grants.		Municipal Grants.		Rents of and Admissions to Grounds.		Moneys on Loan.		Sale of Machinery, Stock, Seeds, etc.		From other Societies for Amalgamation.		Miscellaneous Minor Receipts.		Totals of Receipts.		Balances due Treasurer.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
WENTWORTH, SOUTH : *																						
Ancaster.....	212	89	155	00	700	00	50	00	29	30	.....	.....	.....	.....	.....	.....	10	53	1078	42	.....	.....
Parton and Glanford.....	72	96	317	50	140	00	50	00	29	30	.....	.....	.....	.....	.....	.....	.....	.....	536	80	19	80
Saltfleet and Binbrook.....	29	54	129	50	111	00	60	00	.....	.....	.....	.....	.....	.....	.....	.....	4	70	378	16	.....	.....
			114	50	106	00	65	00	30	73	.....	.....	.....	.....	.....	.....	.....	.....	345	77	41	27
YORK, NORTH :																						
Gwillimbury.....	104	21	455	75	700	00	150	00	707	31	.....	.....	.....	.....	.....	.....	6	00	2123	27	.....	.....
Gwillimbury, East.....	36	06	177	00	115	23	24	21	.....	.....	.....	.....	.....	.....	.....	.....	11	00	363	50	.....	.....
Gwillimbury, North, and Georgina.....	18	92	190	00	131	10	27	55	145	00	.....	.....	.....	.....	.....	.....	44	05	556	62	.....	.....
King.....	102	15	150	00	80	73	16	96	.....	.....	.....	.....	.....	.....	.....	.....	61	75	699	89	.....	.....
Whitchurch.....	258	90	167	00	91	77	19	28	177	35	.....	.....	.....	.....	.....	.....	31	13	745	43	.....	.....
YORK, WEST :																						
Etobicoke.....	430	30	214	00	700	00	125	00	816	85	.....	.....	.....	.....	144	84	.....	.....	2430	99	.....	.....
Vaughan.....	41	39	83	00	165	00	80	00	126	40	.....	.....	.....	.....	.....	.....	356	50	852	29	.....	.....
	436	67	91	00	140	00	75	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	742	67	.....	.....
YORK, EAST :																						
Markham.....	146	71	764	70	700	00	125	00	1256	30	.....	.....	.....	.....	320	30	.....	.....	3313	01	.....	.....
Scarborough.....	206	24	103	00	140	00	108	20	.....	.....	.....	.....	.....	.....	.....	.....	11	80	629	24	.....	.....
	272	86	220	00	140	00	25	00	169	69	.....	.....	.....	.....	.....	.....	239	00	1066	55	.....	.....

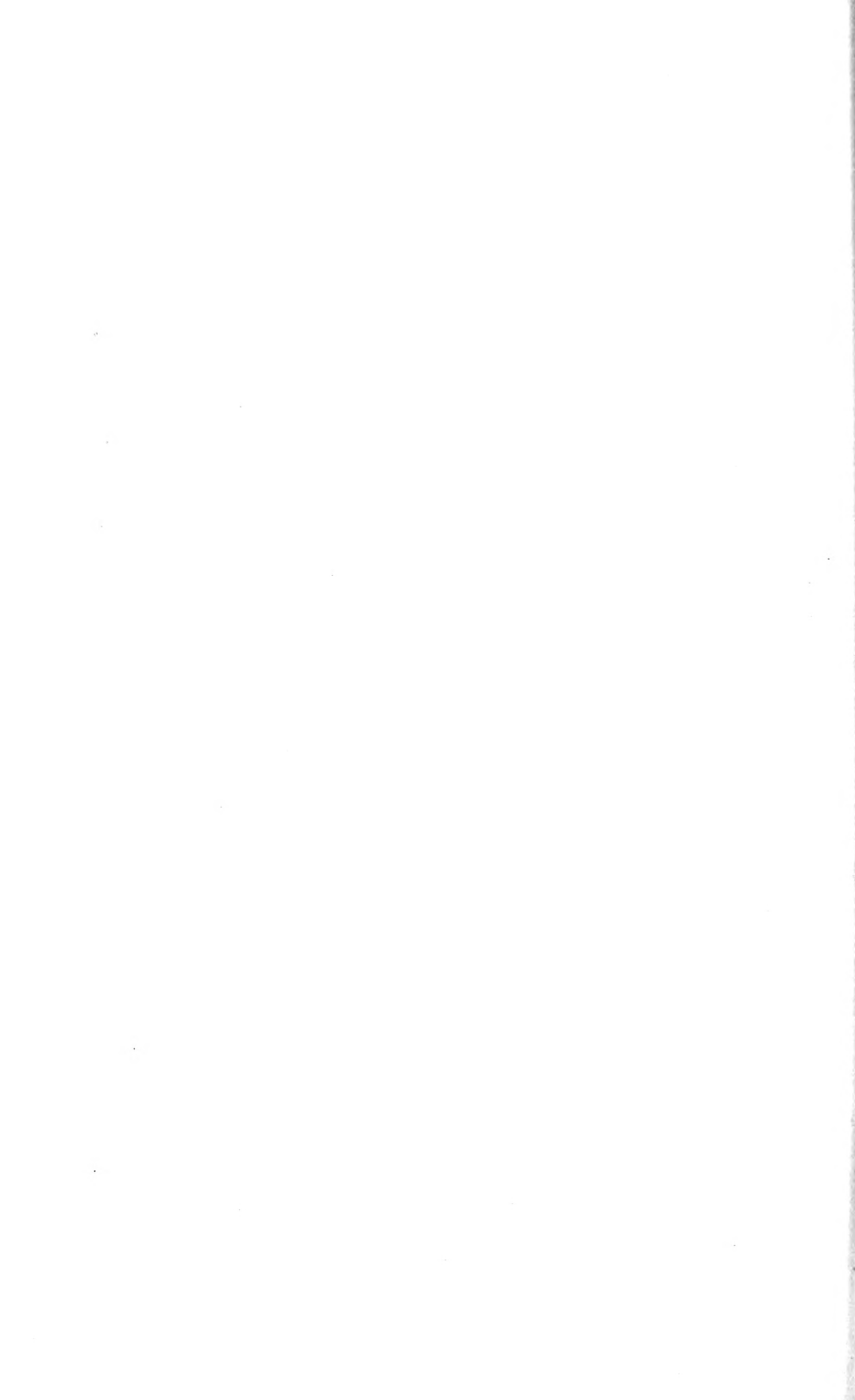
* United with Provincial Exhibition.

† United with Electoral District Society for Exhibition.

ANALYSIS of Reports of County and Township Agricultural Societies, and of Horticultural Societies.—*Concluded.*

EXPENDITURES FOR THE YEAR 1880.

SOCIETIES.	Balances due Treasurers.		Legislative Grants to Township Societies.		Prizes for Animals.		Prizes for Field, Garden and Dairy Products.		Prizes for Manufactures, Fine Arts, and Ladies' Work.		Prizes for Ploughing.		Prizes for previous years paid.		Purchases of Machinery, Stock, Seeds, etc.		Grants to Union Exhibitions.		Buildings and Grounds, Interest & Insurance.		Working and Miscellaneous Expenses.		Totals of Expenditure.		Balances in hand.	
	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.	\$	c.
WESTWORTH, SOUTH:																										
Ancaster	33	90	337	00	249	25	141	75	52	50	50	00					155	00			87	25	649	25	429	17
Barnton and Glanford					141	50	80	75	25	25									5	00	79	20	536	60		
Saltfleet and Bimbrook					181	00	77	25	36	00											89	79	305	00	73	16
YORK, NORTH:																										
Gwillingbury, East			506	83	452	25	224	50	343	75			6	75					134	97	181	45	1850	50	272	77
Gwillingbury, North, and Georgina					150	00	48	00	51	75									175	00	73	25	323	00	40	50
King					123	00	82	25	70	50			10	00					6	00	60	45	521	20	35	42
Whitechurch					311	50	79	00	151	00			9	25							128	80	685	55	14	34
YORK, WEST:																					121	24	476	24	269	19
Boboike			280	00	516	00	168	00	292	00			49	00							455	14	1794	14	636	85
Vaughan					302	00	274	50	674	00			13	00					31	20	97	77	815	97	36	32
YORK, EAST:													70	50					54	90	142	25	412	49	330	18
Markham			330	00	1188	00	412	00	370	00									155	83	530	40	3186	23	126	78
Scarborough					335	00	95	50	127	00											128	70	718	17	348	38



APPENDIX TO REPORT
OF THE
Commissioner of Agriculture and Arts.

APPENDIX (B).

REPORT OF THE COUNCIL OF THE AGRICULTURAL AND ARTS
ASSOCIATION OF ONTARIO FOR 1881.

To the HON. S. C. WOOD,

Commissioner of Agriculture, etc.

I have the honour, on behalf of the Council of the Agricultural and Arts Association, to present a condensed Report of their proceedings for 1881, up to the 1st of November ; the Auditors' statement for 1880 ; the Prize Farm Reports for 1880 and 1881 ; the results of the Thirty-sixth Annual Provincial Exhibition for 1881 ; the Prize Essays on "Forestry" and on "The Best Methods of Restoring the Fertility of Partially Worn-out Lands."

I have the honour to be

Your obedient Servant,

HENRY WADE, *Secretary.*

APPENDIX TO REPORT

OF THE

Commissioner of Agriculture and Arts.

APPENDIX (B).

REPORT OF THE COUNCIL OF THE AGRICULTURAL AND ARTS
ASSOCIATION OF ONTARIO FOR 1881.

OFFICE OF THE AGRICULTURAL AND ARTS
ASSOCIATION OF ONTARIO,

TORONTO, NOVEMBER, 1881.

To the HON. S. C. WOOD,

Commissioner of Agriculture, etc., etc.

SIR,—The Council of the Agricultural and Arts Association of Ontario for the year 1880 and commencement of 1881 consisted of the following gentlemen :—

Elected Members.—District No. 1, D. P. McKinnon, South Finch ; No. 2, Ira Morgan, Metcalfe ; No. 3, Joshua Legge, Jr., Gananoque ; No. 4, J. B. Aylesworth, Newburgh ; No. 5, John Carnegie, Peterborough ; No. 6, George Grahame, Brampton ; No. 7, G. Moore, Waterloo ; No. 8, J. C. Rykert, M.P., St. Catharines ; No. 9, Hon. David Christie, Paris ; No. 10, William Roy, Owen Sound ; No. 11, L. E. Shipley, Greystead ; No. 12, Stephen White, Charing Cross ; No. 13, Charles Drury, Crown Hill.

Ex-officio Members.—Hon. S. C. Wood, Commissioner of Agriculture, Toronto ; Hon. A. Crooks, Minister of Education, Toronto ; George Buckland, Professor of Agriculture of University College, Toronto ; James Thompson Bell, Professor of Agriculture, Albert College, Belleville ; James Mills, Principal Ontario School of Agriculture, Guelph ; William Brown, Professor of Agriculture, Ontario School of Agriculture, Guelph ; James Young, M.P.P., Galt, President of the Mechanics' Institutes' Association of Ontario ; Otto Klotz, Preston, Vice-President of Mechanics' Institutes' Association of Ontario ; E. Jackson, Newmarket, Elected Member of the Mechanics' Institutes' Association of Ontario ; William Saunders, London, President of the Entomological Society of Ontario ; P. C. Dempsey, Aldboro', President of the Fruit Growers' Association of Ontario ; Hon. G. W. Allan, President Ontario Society of Artists ; K. Graham, Belleville, President of

the Dairymen's Association of Eastern Ontario; E. Caswell, Ingersoll, President of the Dairymen's Association of Western Ontario.

Officers.—President—J. C. Rykert, M.P., St. Catharines; Vice-President—J. B. Aylesworth, Newburgh; Treasurer—Geo. Graham, Brampton; Secretary—John R. Craig, Toronto; Auditors—John Cavers, of Galt, and Henry Wade, Port Hope.

The first meeting of the Council took place at the Association Board Room, in Toronto, on the 24th and 25th of March—Mr. Rykert, M.P., in the chair. A communication was then read from the Bureau of Agriculture, stating that the following gentlemen had been elected members of the Council for their respective Districts, in accordance with the provisions of the Statute relating thereto, for the next three years:—District No. 9, Henry Parker, Esq., Woodstock (in place of the Hon. David Christie, deceased); District No. 10, Joshua Hunter, Eden Grove (in place of Wm. Roy, Owen Sound; District No. 11, Lionel E. Shipley, Greystead, re-elected; District No. 12, Stephen White, Charing Cross, re-elected; District No. 13, Charles Drury, Crown Hill, re-elected. The Association then proceeded with the election of officers for the present year. Mr. J. B. Aylesworth, Newburgh, was appointed President; Mr. Charles Drury, Crown Hill, Vice-President, and Mr. Graham re-appointed Treasurer. It was also resolved that a memorial be drawn up expressing the sympathy of the Council with the family of the late Hon. David Christie, and their feeling of great regret at his sudden demise. Several communications from exhibitors of last year were read and disposed of; also a letter from the Mayor of London relating to the requirements of the next Provincial Exhibition. The Treasurer submitted his accounts for the previous year, as examined and passed by the Auditors, shewing that, including the balance of \$1,075.42 from the year 1879, and the amount raised by mortgage on real estate (\$5,000), the sum of \$27,035.29 had been received, and the sum of \$31,444 had been expended for the various purposes of the Association, leaving a balance of \$1,666.09 in the bank at the beginning of the year 1881, as per table submitted herewith:—

ABSTRACT OF RECEIPTS AND EXPENDITURES of the Agricultural and Arts Association for the Year ending 31st December, 1880.

RECEIPTS.	—	PAYMENTS.	—
To Balance on hand, 1st January, 1880.....	\$ c. 1075 42	By Exhibition Expenses	\$ c. 9500 38
" Members' Fees.....	1626 50	" Prizes	13476 50
" Herd Book	13 50	" Printing and Advertising	1876 03
" Prize Account	507 00	" Postage	429 22
" Registration Fees	1216 82	" Salaries	3155 00
" Interest	96 81	" Council Expenses	491 48
" Rent	1000 00	" Stationery	372 57
" Legislative Grant	10000 00	" Herd Book	214 00
" Booth Rents	121 00	" Veterinary College	530 00
" Exhibition Receipts.....	11283 66	" Committee's Expenses.....	99 50
" Amount Borrowed on Real Estate	5000 00	" Legal Expenses	10 00
" Miscellaneous	80 00	" Miscellaneous.....	1289 84
		Balance.....	31444 62
			1666 09
	33110 71		33110 71

Audited and found correct.

JOHN CAVERS, { *Auditors.*
HENRY WADE, }

TORONTO, 4th February, 1881.

At this meeting the Executive, Finance, and other Committees for the year were appointed. A great deal of care and attention was given to the drawing up of a report as to the more economical working of the Association, and recommending certain changes and revisions in the prize list, also preparing instructions for the different Superintendents of Departments. The time was also finally fixed for the holding of the thirty-sixth Provincial Exhibition at London, viz., from the 21st to the 30th of September next. The Secretary was instructed to have the four volumes of the Canadian Shorthorn Herd Book advertised for sale in a few of the prominent papers. A number of accounts were submitted and examined by the Finance Committee, and ordered to be paid. It was also ordered that the printing of the Council for the present year be tendered for. At the conclusion of this meeting the Secretary read a letter tendering his resignation—in consequence of ill-health, and his intention to take a trip to England—which was accepted. The meeting then adjourned until the 27th April, to appoint another Secretary, and for the despatch of other business.

In the interval there was a meeting of the Executive Committee held in the City of London, on the 20th April, 1881, to meet and confer with the local Committee of that place. An estimate of requirements was made out, and concurred with by the Mayor, Mr. Campbell, and the Exhibition Committee, who promised to do everything in their power to make the coming Exhibition a success.

The adjourned meeting of the Council was held at their Board Room in Toronto on Wednesday, the 27th April. Various communications and reports were read, among which the following may be mentioned: Answers from manufacturers of machinery about motive power for the London Exhibition; also a letter from Thomas Guy, of Oshawa, asking if the Council intended to publish the Ayrshire Herd Book shortly, and wishing them to reconsider some of the rules. This letter was referred to a committee, who reported that they recommended that a meeting of the breeders of all kinds of thoroughbred stock be called during one of the evenings of the Exhibition, to ascertain from them their opinions as to this and other matters relating to the Herd Book generally. There were also a few more alterations made in the prize list. The tender from the Globe Printing Co. was accepted, as being the most satisfactory. Accounts to the amount of \$219.26 were submitted and ordered to be paid. The Finance Committee also reported as to stock of Herd Books, medals, and other material on hand, the property of the Association, to be handed over to the new Secretary. Also the Special Committee appointed to enquire into the working of the Association, with a view to add to its usefulness and efficiency, reported, curtailing salaries and pointing out the duties of the different employees of the Association, both in the office and at the time of the Exhibition; also recommending the Council to offer two prizes for the best essays on "*Forestry*," and two prizes for essays on "the best methods of restoring the fertility of partially worn-out lands;" also recommending that some evenings during the forthcoming Exhibition be set aside for discussions on different subjects of interest to farmers and others. The Council then proceeded to ballot for a new Secretary, and, out of fifteen applicants, Mr. Henry Wade, of Port Hope, was the one who received the greatest number of votes, and was duly elected. After transacting other routine business, the Council adjourned until the time of exhibition, in London. To retrograde a little, the Council, at a meeting of their Board in March, 1880, decided to offer prizes for the best-managed farms in the different divisions in Ontario, and that the awards be in the shape of medals—gold, silver and bronze. The different Electoral District Societies in Ontario were to be divided into groups, and the prizes for the first year, 1880, to be awarded in Group No. 1, comprising the following Electoral District Societies, viz.:—

GROUP NO. 1.

Niagara, Welland, Lincoln, Haldimand, Monck, Wentworth (North and South), Brant (North and South), Norfolk (North and South), Waterloo (North and South), and Halton.

The best-managed farm in all this group to be awarded a Gold Medal, the second-best a Silver Medal, and the best-managed farm in each Electoral District Society a Bronze Medal. Through an inadvertence, the very interesting and instructive report drawn up and presented to the Council by the Judges in 1880 was not published in our Report to yourself for that year, but is presented now:—

REPORT OF THE JUDGES ON PRIZE FARMS, 1880.

Having been appointed judges of the farms entered for competition in No. 1 Division, and having received certain instructions to guide us in making the awards, we at once arranged to begin the work entrusted to us. The following are the instructions we received, and which we have, to the best of our ability, endeavoured to carry out:—

1. The judges shall keep a detail of marks awarded to each farm visited. They shall award to the best-managed farm in each electoral district a bronze medal, where three farms have competed; and instead thereof to the best-managed farm in the group a gold medal, and to the second-best farm a silver medal.

2. In addition to any other points that may be thought desirable, the following shall be taken into consideration in estimating what is "the best-managed farm:"—

(1) The competing farm to be not less than one hundred acres, two-thirds of which must be under cultivation.

(2) The nature of the farming—whether mixed, dairy, or any other mode—to be the most suitable under conditions affected by local circumstances.

(3) The proper position of the buildings in relation to the whole farm.

(4) The attention paid to the preservation of timber, and shelter, by planting of trees.

(5) The condition of any private roads.

(6) The character, sufficiency, and condition of fences, and the manner in which the farm is subdivided into fields.

(7) Improvements by removal of obstacles to cultivation, including drainage.

(8) General condition of buildings, including dwelling-house, and their adaptability to the wants of the farm and family.

(9) The management, character, suitability, condition, and number of live stock kept.

(10) The number, condition, and suitability of implements and machinery.

(11) State of the garden and orchard.

(12) Management of farm-yard manure.

(13) The cultivation of crops to embrace manuring, clearing, produce per acre in relation to management, and character of soil and climate.

(14) General order, economy, and water supply.

(15) Cost of production and relative profits.

NIAGARA.

MR. OSMOND'S FARM, NIAGARA.

On the 6th of July we met in Toronto, and from there proceeded by the steamer *Chicora* to Niagara, where we were met by Mr. Servos, Secretary of the Niagara Electoral Agricultural Association, who very kindly offered to drive us to the different competing farms in his division. Taking advantage of his offer, we first visited the farm of Mr. Osmond, situated about two miles from the town of Niagara, on the road to Clifton. This farm contains one hundred and twenty acres, bounded on one side by the lake. The situation is a pleasant one, overlooking Lake Ontario; and in the summer all the boats coming in from the lake have to pass near here. We were rather disappointed in going over this farm, for, although it was passably fair, there was nothing whatever to take it out of the ordinary run of fairly-managed farms. The soil is mostly sand; and this season having been favourable for light soils, we found the wheat (25 acres) pretty good,

with nice clean bright straw. It will probably yield about 26 bushels to the acre. Oats short in the straw, and not a good crop. A good breadth of corn and potatoes is grown. About eight acres of the latter had been planted in a peach orchard of two years' growth. Both the potatoes and the young peach trees seem to be doing so well, it was not easy to tell which had the advantage. Part of the land planted with corn had been manured; there it looked well, and will be a good average crop; the unmanured was poor, and did not amount to much. The hay, which was already stacked and housed, had been well managed, the hay being fresh and green. We were informed by Mr. Osmond that it had yielded two tons per acre. From the nature of the soil we would hardly have supposed it to have yielded so much. The buildings and fences were not as good as they ought to have been on a competing farm. The cattle would have looked better, and the proprietor would have made more of them, if he had paid a little more attention in years past to the selection of his bulls. Mr. Osmond, like most of the farmers in that section, is going largely into fruit, his land being specially well adapted for it. Having finished our inspection, we drove to Mr. Servos', where we were kindly entertained until the next morning. Mr. Servos is one of the most extensive fruit growers of the Niagara district, and evidently thoroughly understands his business—the fruit from this farm standing high both in the Montreal and Toronto markets.

MR. SHEARER'S FARM, NIAGARA.

In the morning we went to Mr. Shearer's. This farm contains one hundred and fifty acres, and requires a great deal to be done before it is put into right shape. It should never have been entered for competition, and to go on describing it would only be a waste of time. It may be said, however, that Mr. Shearer, who is a tenant, has not a good chance. A great deal of money requires to be spent in many ways. The whole thing is out of order.

MESSRS. HUTCHISON'S FARM, NIAGARA—BRONZE MEDAL.

The next farm visited was that of the Messrs. Hutchison, three miles from the town of Niagara. It contains 100 acres. The soil might be termed light clay. It is mixed in some parts of the farm with a good deal of shale, or small stone. It is bounded on two sides by the public road; one of these sides has a capital stone dyke running along nearly the whole length of the farm. The other ring fences, as well as all the cross-fences, are rail, but of the best description, and put up in the best possible manner. Private road exceedingly well kept, and so arranged that all the fields open into it. The fields, with the exception of a few smaller plots near the buildings, are of a uniform size of ten acres each. The system of rotation is to plough up sod for corn, then follow with barley or oats; after that summer fallow for wheat. The method followed in working the summer fallows is somewhat different to that of many good farmers. Instead of ploughing four or five times, they only plough twice besides the seed furrow. The first ploughing is in the fall, at which time it is deeply done; the second is in the early part of June. The land is then heavily manured and ploughed four inches deep. The rest of the work is all done with the cultivator. At no time are the weeds allowed to appear above the ground, but whenever they show signs of breaking through the cultivator is at once set to work. Although this farm is thoroughly clean and free from weeds, it does not go to prove that this plan of summer fallowing is the best, but rather that there may be various ways adopted of arriving at the same end, and all that is required is that the working should be thorough, and the result in all cases will be pretty much the same. The working of the corn crop is just the summer fallow over again, except the ploughing. Whenever the weeds begin to show signs of breaking through, an attack is made upon them. A capital good plan, for while getting rid of the weeds, the soil is at the same time stirred and worked in the best possible manner for the corn crop. The wheat crop, of which there were thirty-two acres this season, yielded a little over a thousand bushels of a very fine sample. One field on which this wheat was grown had fall wheat the year previous, the crop averaging a few pounds under fifty-one bushels per acre, and was sold

in the town of Niagara for \$1.25 a bushel. The same has been done with another field this season, which at the time of our second visit was finely braided. This way of cropping is certainly contrary to the right principles of farming; but when a man has his farm in such a state of fertility that he can take eighty-three bushels of wheat an acre off it in two years, and then have a fine catch of clover, he may be excused if he does stretch a point. Mr. H. admits the system is wrong, but thinks his land can bear it occasionally. Some of his neighbours have tried it, and failed. Eight acres of corn was a splendid crop—not a weak spot in it. Oats, five acres and a half, even and heavy. The hay was cut before our visit, and had been got in in good order. Twenty acres was cut this year. One acre of potatoes finished up the crops grown on this farm. No turnips, which is rather unusual. Mr. H. thinks he has more profit in growing corn than turnips for winter feed. About twelve cattle are the average number kept, and fifteen sheep. The cattle are good fair grades, and large for their age. The steers, which were two years old last spring, will make fine heavy shippers next Easter. The sheep are a cross between Cotswold and Leicester, and are a very good lot. Pigs good and well bred. Two pair of horses are kept. These are good, useful animals, and well adapted for the work of the farm. Besides their own labour, it costs about fifty dollars for extra help in harvest and in husking the corn crop. The barn we considered small for the quantity of crop grown. The other out-buildings included all that was required for their system of farming. Everything in and around the buildings was in order and in good shape; yards fenced with good straight fences, and substantial gates wherever required. In implements, all was there that are required, and all in good order and well kept. The dwelling-house is a neat little building, well painted and cozy-looking. Between the house and the road are a lot of nice trees, which add very much to the general appearance of the homestead. The garden and orchard are fairly good, with some very good fruit, including pears and peaches. This farm we consider well managed. Great attention appears to have been paid in the proper carrying out of the work in the various departments of the farm. It is exceptionally well tilled, and a naturally good soil has been rendered very fertile by heavy manuring and high farming, the crops showing an evenness and bulk, as well as an absence of all weeds, such as is never seen except where high farming is the order of the day. Everything about the place gave indication of neatness, thrift, and large returns for money and labour expended. It may be considered that too little stock is kept, but it must be borne in mind the manure supply is largely drawn from the town of Niagara, two miles distant, the greater part of all that is made in the town coming on to this farm. Consequently all the surplus straw goes there.

NORFOLK.

Having got through with the examination of the farms in Niagara district, we left same evening for Simcoe, the county town of Norfolk, going by the way of Fort Erie. As there was no train connection in the evening, we had to remain over night at Fort Erie, starting early next morning, and reaching Simcoe about 10 a.m. Here we were again fortunate in being met by Mr. Murphy, Secretary of the N. R. Society. Like Mr. Servos, he had made the best possible arrangements for our convenience and comfort. We were met by him at the station, and during our stay of two days, as well as on the occasion of our subsequent visit, he showed himself kind and considerate in doing whatever he thought would in any way tend to make our work more agreeable. And we would just take this opportunity of saying that judges can have their work very much lightened and made much more agreeable by a little consideration on the part of those in whose county the work has to be done.

MR. WOOLLER'S FARM, WINDHAM.

The first call made was on Mr. Wooller. This gentleman is an active, go-ahead farmer, apparently with a good deal of vim and push about him. His farm, containing 286 acres, is on the Simcoe and Waterford road, about two miles from the former place. The soil is mostly a good loam, with part of it, however, inclining to be sour. These

portions would be much improved by under-draining. The system which is followed is mixed husbandry, being grain-growing and dairying. The farm appears to be well adapted for the system which is followed. The number of cows kept is about twenty. The most of them had the appearance of good milkers, but not quite the kind of stock from which we would expect to raise good shipping steers. The milk is sent to the cheese factory, the proceeds from the cows averaging about \$40 per cow. The crops generally were good and bulky. The wheat was being harvested at the time we were there. It was a good paying crop of Clawson. The buildings on this farm are extensive, and some of them very good, but so scattered as to make them very inconvenient. This arises from no fault of Mr. Wooller's, but owing to the farm being enlarged at different times by the purchase of adjoining land with the buildings on. The management of the manure also seemed to be very imperfect, which is partly attributable to the same cause—the awkward position of the buildings. Everything about this place gave indication that it was in the hands of a pushing, money-making man, but there was a roughness and want of finish very noticeable everywhere; buildings, fences, fields, and the yards around the homestead were all more or less out of order, and could be very much improved by a small outlay judiciously expended in the way of a general fixing up.

MR. CARPENTER'S FARM, TOWNSEND—GOLD MEDAL.

The next farm in the Riding that we had to see was that of Mr. J. B. Carpenter, situated nearly opposite Mr. Wooller's. This is an exceptionally fine farm of 315 acres. The soil is mostly a rich, sandy loam, with a small portion on the south side running to sand. The sub-soil varies a good deal, from clay or hard-pan to sand, but over the whole is a good, deep surface-soil, which can be worked deeply without touching poor earth. A considerable part of the farm, from the toll-road running back, is level or nearly so. Towards the back part it becomes undulating, and gradually rising, finishes up with a magnificent piece of wood at the rear of the farm. This wood of twenty acres is beautifully kept, and park-like, and forms a very attractive feature, running along a good part of the back of the farm, where the land rises to the highest point. It forms a back-ground and a finish to what no doubt is one of the finest farms in Ontario. And fortunate it is that this property did not fall into the hands of some Vandal, who by this time might have had this, as well as the other two pieces of wood, which are equally beautiful, converted into so many barrels of potash, and thereby have destroyed what would require the time of two or three generations to replace. The other two pieces of wood are situated at either side of the farm, and each contains about five or six acres. The portion on the south side is also on rising ground, and shows to fine advantage. The woodland altogether covers thirty-two acres. Not only has Mr. C., by the judicious care he has displayed in leaving the timber on those parts of his farm where it is seen to the best advantage, added much to the appearance of a very fine property, but the whole section is in a measure benefited by it, as it improves the landscape view of a much larger area than Mr. C.'s own farm. Besides the original and second-growth timber, a great deal had been done some years ago in the way of planting rows of maples along the sides of the property bounded by the roads. It may be here said that a public road runs from front to rear of the farm, that running along the front being the macadamized road leading from Simcoe to Waterford. Both sides of that road running through the farm are planted, and now form a beautiful avenue. Again, the same remark is applicable, that not only is his own property beautified and improved, but the township, and even the town, of Simcoe is in a measure benefited by his improvements, for none can more fully appreciate the advantages derived from having our country roadsides planted with trees than our townsmen at those times when business or pleasure requires them to use them. And in connection with this, we may be allowed to throw out the suggestion that it might be a question well worth considering whether it would not be well for our Legislature to hold out some inducement for the work to be gone more generally into. It is true that certain powers are given to Municipal Councils to deal with the matter, but, judging by results, very little has been done through their instrumentality. There is, of course, one difficulty which stands very much in the way of general tree-planting on our highways,

and that is the want of a stock law, which would make it prohibitory for stock to run at large. That, too, is placed in the hands of the Council, but except in cities and towns it is simply a dead letter. And it certainly might be well worth considering whether it would not be in the interest of the country for the Legislature to deal with the matter. There is little doubt that if both these questions were dealt with so as to give some protection to landowners, the face of the country in the older-settled parts would soon be very much changed for the better. The only part of this farm that is at all broken is on the north side, where a spring creek runs through. About eight acres is here used for permanent pasture. The creek has a good supply of water at all seasons, and is very valuable where so much stock is kept. The system of farming that is followed is one of mixed husbandry, comprising grain-growing, stock-feeding, and dairying. No particular rotation is closely adhered to, wheat generally following peas and also after clover. Corn, "which is grown very extensively for both winter and summer feed," always from sod ploughed up. A good breadth of turnips are grown, followed the next season with barley. The quantity of the various crops grown this season was:—Wheat, 34 acres; 7 acres in barley, 72 in hay, 25 in corn, 10 in corn fodder, 10 in turnips, and 10 in potatoes. There were 45 acres of grass pastured, as well as 20 acres of oats, and 14 acres of rape sown on land where it was intended to put in wheat. All these crops, with the exception of turnips, are heavy and good. The hay at the time of our visit was, with the exception of one field, all stacked and housed. The field then being drawn was very heavy; it was being put into a stack; and it struck us as rather strange that where such a large weight of stuff had to be handled during the season, that a horse-fork was not in use for unloading. The two fields of wheat were very fine, level, even crops, with plenty of good clear straw, and could not fail from giving a good return. The great crops, however, were corn; they were simply enormous. That sown for fodder had been in use for some weeks, supplying over seventy cattle with all they could eat three times a day, and a comparatively small piece had been used. The remainder was being cut with a reaper and set up for fall and winter use. This field is estimated to yield 25 tons to the acre. The regular corn crop was, at our second visit, also being harvested; it is estimated to produce 120 bushels of ears, or 60 bushels of shelled corn, per acre. The turnips were the only crop that was not up to the mark; from some cause they did not look so forward and healthy as might have been expected on a farm so highly tilled. One of the reasons probably was that they were not well enough attended to at the time when they should have been hoed, Mr. C. having at that time a great deal of work crowded on his hands, for besides haying, harvesting, hoeing corn and turnips, all on at the same time on account of harvest being unusually early, he was also in the midst of extensive building operations. Besides the field of Swedes, there was another field of stubble turnips sown after fall wheat, which are intended to be eaten off this fall.

There are at this time 82 head of cattle; 37 of these are pedigreed Shorthorns, and 20 are cows kept for dairy purposes, the balance being young stock of different ages, amongst which are a good number of fine fleshy steers for fattening this winter—just the sort of stock for making good shippers next spring. The thoroughbreds are a fine lot, good pedigrees, and good animals. Among the cows and heifers, and especially in this year's stock of heifer calves, are some very fine specimens of animals, which would not be at all out of place in the yards of the best breeders in Ontario. In the bull stable are six bulls, five of them of different ages, all under two years old; the sixth, the stock bull used on the farm, a large, massive animal, with the fine points of a good Shorthorn well developed. This bull was bred by Colonel Taylor, of London. Taken altogether, this is a very fine herd of Shorthorns, both as regards breeding and also in respect to the individual merits of the animals. And if Mr. C. is not heard of in the show ring, it must be owing to his inclination not running in that direction, for he certainly possesses the requisites necessary for a successful exhibitor—a splendid herd, a good knowledge of breeding and feeding, and the advantages which a large farm specially adapted for raising cattle food always gives to a man whose attention is directed in that way. The dairy stock, as already said, comprises 20 cows. These cows are of the ordinary run of stock, but selected specially for their milking qualities. The milk is sold in the town of Simcoe. This is a very profitable department of the farm, Mr. C. realizing at the rate of \$80 per

cow during the year. This seems to be a very large return, but it must be borne in mind that the milk is sold retail, and that while receiving the highest price by selling it in that way, it entails a good deal of extra labour in distributing it among such a large class of customers. Another thing to be considered is that the cows, as well as being carefully selected for their milking qualities, are specially well fed both winter and summer with food that has a tendency to induce a large flow of milk.

The winter mode of feeding is cut straw and hay in equal parts, with sliced turnips and bran dampened with water, and a sprinkling of salt at every feed. In the summer, as soon as grass begins to fail, they are turned on to rape, and after that are soiled with green corn. The feeding of all the stock is carried on liberally. In the winter all the feed is cut; no such thing as a rack in any of the cattle stables, Mr. C. considering it better for the stock and more economical that all fodder should be cut. In the summer any stock kept housed is supplied with cut fodder, bran, meal, and mangolds until they are done, which this season was not until well on in the summer. In the summer, as soon as grass begins to fail, they are fed with all the green corn they can eat three times a day. The feeding is usually done on a grass field intended next season to be planted in corn. This is done for the purpose of enriching it. At the time of our second visit there were 70 cattle being fed in one field in that way, it requiring a good deal of attention to lay the corn down in clean places. That way of treating the land readily accounted for the enormous crop we saw growing this season. The usual number of sheep kept is about a hundred, half being Southdowns and the others Leicesters. Mr. C. rather favours the Southdown, thinking that, all things considered, they are the best sheep for this country. The outbuildings we found somewhat irregular, part of them apparently having been built many years ago. This year, however, he has gone largely into building, having built very extensive stables, with room above to hold a great quantity of hay, straw, and fodder. This building is 104 feet long by 54 feet wide, and 22 feet from the floor to the eaves. On the ground floor are two stables, one on either side running the whole length of the building, each stable having stalls for 28 cattle—the heads of the cattle standing towards the centre of the building. The stalls are all made to hold two cattle each, with strong plank divisions and large strong plank troughs for feeding. The floor is being made after the plan of the cedar block pavement, which is heard so much about. The cedar blocks are cut six inches long, set end ways on a bed of sand, the open spaces filled with sand, and then well pounded. This makes a capital floor, and when well done remains even and smooth, and will last many years without going wrong. The space between the two rows of cattle is 20 feet wide. At each end of this are box stalls. The pump is also in this space. The remainder will be used for feeding purposes. Divisions will be made here for holding cut hay, straw, and green fodder. The upper part of the building will be reached by an inclined roadway from the end, and besides being used for the purposes already mentioned, all the feed will be cut here, from whence it can be easily passed down shutles to the fodder boxes below. It is the intention of Mr. Carpenter to keep the greater part of his cattle in these stables in summer, intending to go into soiling extensively. For that purpose one could not readily conceive anything much better suited. The green fodder being cut above would pass down in front of the cattle, thereby saving a good deal of handling—no inconsiderable matter where so many cattle are to be fed with heavy green fodder. Besides these stables is the bull stable, a separate building, with box stalls for eight bulls. Then comes horse stable, sheep-house, and piggery, buildings which will answer the purpose, but not at all in keeping with the cattle stables. The dwelling-house is a snug-looking frame building—rather small, however, and would be quite unsuitable for a farm of that extent, and especially the way it is farmed, requiring so much labour, if the men boarded in the house. But Mr. C. has very wisely got rid of that part of the drudgery of our farmers' wives. The garden and orchard are well stocked with the vegetables and fruits for which the climate is suited. Grapes and pears were particularly noticeable; perhaps more so as, after having got through with our inspection, we were invited to stay to dinner, when we had the opportunity of putting to a practical test the different varieties. Three teams are kept, and five men are regularly employed. In the management of labour Mr. C. has taken a step in the right direction. Instead of having his men all boarding in the house,

he employs married men, paying them \$200 a year, with house-rent, garden, firewood, and keep of a cow. The houses which his men occupy are comfortable-looking, and so placed as to be convenient for the men, and yet at the same time in no way to interfere with the privacy of the proprietor, and on the whole gave rather an appearance of snugness and finish to the establishment. This plan of engaging married men, and giving them the use of comfortable and cheerful-looking homes, is one that we consider might be followed with great advantage by many of our farmers. It forms a sort of bond between master and men; it gives the men an opportunity of spending all their spare time in the midst of their own families, and if things are made comfortable for them—as they ought to be—the employer is much more likely to retain the services of good men than he is when having to depend altogether on unmarried men. And then again, one of the not least important features in connection with the system is, that it does away in a great measure with the drudgery of the farmers' wives and daughters. And there certainly seems no more reason that our farmers' wives should have all the work connected with boarding a lot of hired men than that the manufacturers or merchants should board their workmen or assistants. It is simply a custom, and a bad one, and the sooner it is changed the better. In another way do we also consider Mr. C.'s management of farm labour far ahead of the plan generally adopted by farmers. Instead of the hours of work being, as is too often the case, regulated by the rising and setting of the sun, or in other words, making the men often work in the long days of summer almost as long as there is light, they are only required to work ten hours a day, besides the time necessary to attend to their teams, Mr. Carpenter considering that while it is better for both men and teams, that he is also not in any way a loser. In conclusion, it may be said that we consider this the best-managed farm amongst those entered for competition, and a notable example of what may be achieved when sound judgment and industry are brought to bear on the operations of the farm. Not only is Mr. C. the owner of this fine property and all it represents, but a good deal more besides. His whole family of ten children, "with the exception of the youngest son, who goes to college next term," have all, in addition to having passed through the Grammar School, received a full college course—girls as well as boys, the girls having attended the Ladies' College. Thousands of dollars have been spent in that way.

MR. M'MICHAEL'S FARM, TOWNSEND.

Leaving Mr. Carpenter's, we drove eight miles through a well-farmed district to Mr. McMichael's, situated in the Township of Townsend, one and a half miles east of Watford. This farm contains 250 acres, 195 being under cultivation, 35 swamp, and 20 acres of hardwood. The soil varies a good deal, comprising 40 acres of sand, 25 acres clay loam, and marl 130. A large amount of money has been spent on this farm in draining and other improvements—not less, the proprietor informed us, than \$18,000 or \$20,000. Of course, included in that expenditure is a magnificent house and a splendid homestead. On what may be termed the bottom lands of this farm there have been made about three miles of surface and under-drains. The surface-drains are constructed up two ravines which run across the land nearly parallel with the fences. The drains are made dish shape, so that the plough can cross them, and the fields are always ploughed in that way. The under-drains were put down three feet deep, and have been so placed as to cut off all the springs that come out of the higher ground, and to empty all the basins that were on the low land. The result is that this land, which was so wet before it was drained that in every field when the grain was sown it was necessary to swim the harrows over quite a portion of them, and acres of the flats would mire the cattle, was, at the time of our visit, bearing crops of oats the equal of which are seldom seen. Elevated about sixty feet above the flats already spoken of is a ridge of sand sloping down to the bottom lands. This land is cropped differently to the rest of the farm. The rotation is potatoes, wheat, and clover. In the spring the land intended for potatoes is given a good coat of manure, ploughed with a jointer plough, harrowed, and then marked both ways with a marker three inches deep, hills three feet apart both ways, and planted with eight bushels of good-sized Early Rose potatoes (cut) to the acre. As soon as the potatoes are break-

ing the ground the hills are covered to the depth of about two inches with a reversible tooth cultivator, the work being all accomplished with the cultivator and hiller. Mr. McMichael informs us that he has grown on this land within the past six years between eleven and twelve thousand bushels of Early Rose potatoes, and has found them highly remunerative. As soon as the potatoes are taken up the land is prepared for wheat, and sown with one and a half bushels to the acre. In the spring it is seeded with clover and timothy at the rate of six quarts to the acre. The first season it is cut as soon as it is in bloom, and then left to mature a crop of clover seed, last season's crop realizing \$500, besides keeping what was required for the farm. On the clay loam: Barley, peas, wheat, and grass fallow, the land being deeply ploughed in the fall with a jointer plough, and well cultivated in the spring, which is more readily done owing to the land being well drained. It is then sown with seven pecks of barley or two bushels of peas to the acre. If the land has become dirty, instead of growing barley or peas it is thoroughly summer fallowed, and then sown with wheat. On the bottom lands oats, timothy, and red-top are grown—one and a half bushels of oats are drilled to the acre. Salt is also sown for the purpose of destroying the wire-worm and to stiffen the straw. Both the swamp land and hardwood are well attended to, all the fallen timber being regularly made use of every season. The stock is not allowed to run in the wood, which is fenced round, so as to get a good growth of young timber.

The cattle include seven or eight grade cows with their produce, and are not at all up to the mark. More cattle are bought as may be required for the purpose of using up the surplus fodder. Seventy-five well-bred Leicester sheep are kept. A good many of the ram lambs are sold in the fall for stock, the balance going to the butcher. The ewes at four years old are fattened, averaging from 180 to 200 pounds. Three span of horses are kept, one pair being for driving and light work.

Fruit-growing is a specialty with Mr. McMichael; great care is bestowed on his orchards, which are extensive, and include apple, pear, peach, plum, and cherry trees. In apples nothing is grown that is not considered good winter fruit; Northern Spy and R. I. Greening principally, with a lot of Baldwins, Spitzenbergs, and a good many comparatively new varieties, which are being tested. The land in the apple orchard is liberally manured with barn-yard manure and fresh ashes, and is always under cultivation. Every fourth year a crop of potatoes is grown. Every tree is carefully attended to. About the last of May, when the trees are wet, the rough bark is scraped off from the trunk and limbs, and they are washed with a mixture of soap, cow-dung, and water, applied with an old broom. The bearing trees are then bandaged with strips of old carpeting four inches wide, for the purpose of capturing the larva of the Codlin moth. The bandages are placed around the centre of the body of the tree and fastened with a nail. Every twelve days the bandages are examined and the worms destroyed until the middle of August, after which they are left until the fruit is all gathered; then the bandages are carefully examined, the worms destroyed, and the bandages stored away for next season's use. The trees are pruned every year, and all the sap shoots taken off in August. Any variety of apples or pears that does not suit is grafted. The apples are stored away until the spring in a cellar under the carriage-house, specially built for the purpose, with storage room for a thousand barrels. Mr. McMichael expects in a few years to have on the market in the spring from two to three thousand barrels of apples of the best varieties. In the pear orchard the land is partly clay loam and partly sand. The best growth was made on the clay loam, but the trees were worse blighted than on the sand. This was incomparably the most healthy-looking pear orchard we had seen. Mr. McMichael says that three years ago the trees were blighting badly, and that to counteract that he gave them a coating of raw linseed oil, slitting through the bark of the larger limbs and trunk with a sharp knife, and cutting off all the diseased limbs, repeating the operation last year. This year again the oil was applied, but as yet not a diseased twig has been seen. The Bartlettts were contracted for last year at eight dollars a barrel in Montreal, and this year the crop has been sent, but the returns have not been received. Bartlettts and Flemish Beauty are chiefly grown, with a good many other sorts in smaller numbers. Peaches, cherries, and plums are grown less extensively, but equal care is bestowed on the management and the selection of the best varieties.

The buildings are all that is required for the purposes of the farm, and are well constructed and convenient. In regard to water supply, there is under contract to be finished early in September the erection of a Galladay Standard wind-mill and force-pump, to be secured from the frost. The tank for the stock is to be on the floor of the cattle barn, and to be fitted out with automatic conveniences. There is also a tank to be put up about thirty feet from the ground for summer use for lawns, etc. The cost of all is \$225. This does not, however, include piping. The dwelling-house is an exceptionally fine one, built of brick, two stories, with tower. The situation is commanding, and good use has been made of it by erecting a house which both proprietor and architect have good reason to feel proud of. Not only is the general appearance very fine, but it is built in the most substantial manner, has all the modern improvements in the way of heating, ventilation, etc., and at the same time the general requirements of a farm-house have by no means been lost sight of. This house, with its surroundings of ornamental trees, shrubbery, garden, and gravel walks, is such as is seldom seen outside of our cities or large towns.

MR. FRINDER'S FARM, WOODHOUSE—BRONZE MEDAL.

In good time next morning Mr. Murphy was on hand with his fast-stepping horses and comfortable carriage, and we started on our tour of inspection of the farms in the South Riding. The first visited was that of Mr. Frinder, in the Township of Woodhouse. The size of the farm is 100 acres, 83 of which are cleared, the balance being wood. The weight of the crops on this farm surprised us when the nature of the soil was considered. Judging from its appearance, one would not have supposed it likely to produce heavy crops without exceptionally heavy manuring. It is a free, easily worked, yellowish sand, which, when taken in the hand, has rather a greasy, clayey feel, in distinction to the rather sharp feel of our ordinary sand. The system followed is a very simple one as regards cropping. It may be described as growing clover and wheat. About one-fourth of the cleared land is annually in wheat. Heavy crops of clover are ploughed down in July or August, and the land then prepared for wheat, with the addition of as much manure as can be spared. However, the principal reliance for manure for this crop is the clover, and, judging from the wheat then being harvested, the system seemed to be followed with good results. Of course, from what has already been said, it will be understood that the winter killing of clover on this farm is something that rarely happens. At the time of our visit Mr. Frinder had just finished ploughing under a very heavy crop, chains having been used on the ploughs for the purpose of pressing it down, and so well had it been done that not a stalk was to be seen. Another very heavy crop was seen, in which his cows were then pasturing and seemingly enjoyed life to the full. Clover is sown with all the grain crops, so that every field that is ploughed has more or less of a coating turned under. This plan seems to be one that might be followed with good results in every farm favourable to its growth—at least when seed is cheap, or when it can be bought at a reasonable price. And so it seemed to be considered by many of the most successful farmers, it being a plan which we found was a good deal followed. The wheat which was being harvested at the time of our visit would probably yield about thirty bushels to the acre. On inquiring what it followed, we were informed that the previous year a crop of hay was first taken off, then clover seed, and ploughed up and prepared for the present crop. Mr. Frinder, however, explained to us that he does not approve of that way of doing, and that this was something exceptional; but believing that that particular field was in extra good heart, he drew more heavily upon it than, as a rule, he considers it well to do. The other crops, including corn, oats, barley, turnips, mangold, carrots, and potatoes, were promising-looking, the corn and oats especially so. The roots were not far enough advanced to be able to speak of the probable yield, but they had been well put in and well attended to. The mangolds were well forward, and with favourable weather could hardly fail of being a good average yield, if not a good deal more. Six milch cows are kept, and from their produce two of the best calves are kept each year. Enough stock is bought in the fall to consume all the roots and coarse grains, all of which are fed on the farm. The cattle are good grades, Mr. F. never using anything but pure-bred Durham bulls. Fifteen Leicester ewes with their lambs is about

the average stock on this farm. They, like the cattle, were rather a good lot. Three horses are kept for the work of the farm, and one man is hired for eight months at from \$13 to \$14 per month. The rest of the work is done by Mr. F. and his boys. To sum up, it may be said the land was clean and free from all obstructions to cultivation; the fields of a uniform size, opening on either side to a good private road, with good fences well put up, and gates wherever required; buildings passable; implements good and well kept—those not in actual use well cleaned and neatly put away in a building specially built for the purpose. Very little money or labour appeared to have been expended on this farm for show; “if a little had been it would not have been amiss;” but in every department and in every operation the useful and profitable seem to be what guides Mr. Frinder in his course of action. There is no doubt that exception will be taken by many good farmers to the system of cropping followed by Mr. Frinder, and there is no getting over the fact that it would appear to be an exhausting course. But what can be said against it, when we are told that the same rotation is now followed that has been followed ever since the farm came into the hands of the present owner nineteen years ago, and that the land is more productive now than it was then? If such is the case (and from careful inquiries we found there was no reason to doubt it), it certainly must be a money-making system so long as it lasts. Mr. Frinder takes this ground, and we think wisely, that so long as his land shows no signs of becoming clover-sick, or of failing to produce good average crops of wheat, he will continue the same mode he is now following—for he knows of no other way by which he can make so much money. But, on the other hand, should his land show signs of becoming tired of this short rotation, he would at once be prepared to make such changes as he thought advisable. There is one thing to be remembered—that is, that this soil appears to be peculiarly well adapted for the growth of clover and wheat; and further, that the roots, fodder, and all the coarse grains are consumed on the farm, and, if this year is an average, it is in no way inconsiderable.

MR. DAWSON'S FARM, CHARLOTTEVILLE.

Leaving Mr. Frinder's, we drove through rather a poor section to Vittoria, where we met Mr. Mabey, the Secretary of the South Riding Society, who accompanied us on our visit to the other two farms in the riding.

The first one called at was that of Mr. Dawson. This farm comprises three hundred acres; two hundred acres, however, was all that was entered for competition. This farm is managed ordinarily well, but there is nothing at all about it indicating high farming. The crops were a fair average, taken altogether. Hay a heavy crop; wheat an average; and barley on the light side. A noticeable feature was a lot of good dairy cows, twenty-four in all, and a few very good Shorthorns. Mr. Dawson intends to go more largely into breeding the latter class, and if he displays the same wisdom in breeding as he has done in selecting those now on hand, he will be very likely to make it a success. The dairy cows, as already said, were a good lot. The milk of the cows is, with the exception of Saturday night's, sent to the cheese factory, a short distance off. The returns from the factory for the milk from these twenty-four cows, from the 1st of March to 18th of August, was \$784, being an average per cow of \$32. Several of the cows did not come in till after the middle of May. They are expected to average for the season from \$46 to \$48, exclusive of Saturday night's milk. This is a good deal higher than the general average of the neighbourhood, probably about one-fourth. Or for the whole supply of the factory at from \$30 to \$35 per cow. The dairy cows were fed last winter until January with half a bushel of swedes, corn stalks, and barley straw. After that time all the clover and timothy hay they could eat, with the addition of four quarts of corn and peameal and a few turnips in the spring. Comfortably stabled at night, with the run of the yard during the day.

It may be added in connection with this dairy business, that the cost of manufacturing is a cent and three-quarters a pound, which charge is first taken out, then the net proceeds after going to those who supply the milk. Besides the regular homestead buildings, which are pretty fair, there is a large barn a considerable distance off. While this might be a little more convenient in haying and harvest for drawing in, its advantages

are much more than lost by the extra work in the winter in moving the stuff over, or if consumed at the place in loss to the stock and manure, as there is no good arrangement either for the protection of the cattle or saving the manure. The dwelling-house is a good, snug, old fashioned frame house, painted, and very neat and cosy-looking, and according to many persons' ideas quite as much in keeping with farm life, and perhaps they might consider just as comfortable, as some of the more costly and elaborate structures that are now occasionally to be seen. But these are matters of taste; and if a man feels inclined, and can afford it, there is no good reason why he should not build a fine and costly house if his inclinations lead in that direction. The keeping in order of such a house no doubt adds very much to the burdens of a farmer's wife, but then again comes in the question of taste and inclination—so if she likes to do it, it is nobody else's business. Some very fine trees around and in front of the house add a good deal to the general appearance.

MR. DUNCAN'S FARM, CHARLOTTEVILLE.

From here we went to Mr. Duncan's, it being the last of the farms we had to inspect in the County of Norfolk. It consists of 107 acres of good, fair land, inclining to be rather too light towards the back part of the farm. Mr. Duncan was fortunate in securing by purchase, lately, seven acres joining the rear of the farm. The land is not of much value, being a poor sand; but there is on it a splendid spring, with a never-failing supply of water. A good private road, well made, runs down the centre of the farm, with a row of fields on either side opening into it. The fields are of a uniform size, and well fenced. There is a good deal of the fences straight board fence; two sides of the farm, bounded by the road, is of that description. The crops passably good and appear to be well put in. A field under summer fallow was being well attended to; last year it was covered with stumps; these have all been taken out with a stumping machine, the hardwood ones burned and the pines used for a fence; the fence was well made and thoroughly stock proof; the barn and other buildings connected with it good, well constructed, and very tidily kept. More than ordinary attention is paid by Mr. Duncan in the management of manure. Instead of its being, as is too often the case, allowed to lie scattered all around the buildings and yards, often so thin that every rain leaches through it and every hot day dries it to the bottom, it is all put into one pile, which not only prevents great loss, but by that way of doing there is a general tidiness about the outbuildings such as is the exception rather than the rule with most farmers.

All that can be said about the cattle is that they were neither worse nor better than the most of the common stock we had seen. But the sooner more attention is paid to the breeding the more quickly will there be better returns from that department of the farm. The same remarks which were made about Mr. Dawson's dwelling-house and grounds around are equally applicable to Mr. Duncan's—a snug, cosy-looking place. After finishing up the work for the day and bidding good-bye to Mr. Mabee, we started on our way back to our last night's quarters, pretty well tired out.

BRANT.

MR. BARKER'S FARM, SOUTH DUMFRIES—SILVER MEDAL.

Early next morning we went by Port Dover Road to Woodstock, and from there by G. W. Railway to Paris.

This farm, owned by Mr. Christopher Barker, is beautifully situated on the road from Paris to Ayr, in the Township of South Dumfries. It comprises 200 acres, mostly good sandy loam: 14 acres of this is wood and 12 permanent pasture. It is divided from front to rear by what is known as Huson's Road, and a portion of the back part is cut off by the G. W. R. This portion lying near the Grand River is mostly rugged, but makes a good run for stock, and is well watered. The remainder of the farm, with the exception of one field, is nice, smooth sand, and the soil is well adapted for the growth of general crops. At the time we arrived Mr. B. was cutting round a field of fall wheat preparatory to using the reaper. This, as well as two other fields, making in all thirty acres,

were fine, bulky, even crops of Clawson, of good quality. Besides the fall wheat, the following acreage of the different crops were grown :—Thirteen acres of barley, 15 of oats, of the black main variety ; 6 of peas, golden vine ; 8 of turnips, 1 acre of potatoes, $\frac{3}{4}$ of an acre of carrots, and 2 of corn, 30 acres cut for hay, and 14 acres of pasture in addition to the permanent pasture. The mode of cropping is to summer fallow by ploughing down clover ; this is sown with fall wheat at the rate of six pecks to the acre and seeded down ; this is kept in grass one year, when it is broken up and sown with peas and oats—the quantity of oats used for seed is six pecks, and peas two bushels per acre ; the pea land is sown with fall wheat, and the oat stubble is top-dressed with manure for next year's turnips and other green crops ; the green crops are followed with barley seeded down. All the crops were good and level, clearly indicating thorough working and high tillage. The absence of weeds was very noticeable, every out-of-the-way corner being as clean-looking as the newly-worked field. One very marked feature on this farm was the thorough and workmanlike manner in which all the work in the various departments was performed. A good opportunity was given us of observing this on a large field of turnips, potatoes, carrots, and corn. All the rows and drills were absolutely straight ; if the whole crop had been put in with a gardener's line it could not have looked to better advantage. The turnips in this field were being horse-hoed the second time, and had already been hand-hoed ; they looked healthy, were well forward, and of a uniform distance apart on the drills. Mr. Barker apparently understands the relation which the preservation and proper management of manure bears to successful farming. In common with most good farmers, he sells no hay, straw, or turnips—all is consumed on the farm. Last season, besides meal and other food, six thousand bushels of turnips were fed. During the time the stock is housed the manure is all kept in the yard—in the spring it is all drawn out and piled in a large heap near by, and allowed to remain there until the fall, the yards being thoroughly scraped out. The mode of applying it is to spread it in the fall on the land which is intended for turnips and other green crops next season. It is then allowed to remain on the surface all winter, believing that he derives more benefit from it in that than in any other way, and this opinion held by Mr. Barker is the result of his own actual experience. Of course this is a matter that has been long under discussion among leading scientific and practical agriculturists, whether it is better to top dress and leave on the surface or plough under. So where wiser men have differed we will not offer an opinion. But this may be safely said, that while it might be a good system on farms comparatively level, it certainly would not be a good one on many farms. The heavy spring rains that we almost invariably have about the time the spring frost is going out would waste the slopes and hillsides, and certainly the lowest parts of the fields would get the largest share. Besides the barnyard manure, a good deal is done on this farm in the way of ploughing under green clover on the land intended for wheat. A small field of fall wheat which had been treated in that way, and which had received no other manure, would yield a good deal over thirty bushels an acre, probably nearly forty. It was a remarkably fine piece of wheat, and was past all danger, as it was then being harvested.

Eighteen cattle are the number on hand this summer, this being about the average number kept. Three of these, "a cow and two heifers," are good, pure-bred Durhams—the others are good grades. Six calves are raised annually, and besides the young stock coming in, others are bought in the fall, and turned out for the butcher in the spring. Mr. B. fattens his steers so as to have them into the market at from twenty-four to twenty-eight months old, and so far has realized full prices. He claims that there is decidedly more profit in feeding well and getting them off at that age, than there is in keeping them a year longer. There seems to be no doubt that, so long as the feeder can get full prices at that age, the theory is a sound one. But it has to be borne in mind that for this plan to be carried out successfully, it is necessary that the stock should be well bred, and liberally fed from the time they are calves. The principal food used for making beef is turnips, peameal, and hay. The barns, stables, and other outbuildings are suitable and well placed, forming three sides of a square. Everything in and about these buildings is as trim and as tidy as it can well be—no confusion, no tumbling over things that ought to have been somewhere else—but here "was a place for everything, and everything for its place." Not only that, but we noticed that for all those things

which are used on the farm, and which are most liable to break, a duplicate was ready, so that in case of accident no time would be lost in going to the shop, or repairing it at home. Most farmers have often experienced the loss sustained by not being at once able to replace a broken waggon wheel, a doubletree, or some other trifling thing at a time when every minute was valuable in the midst of a busy harvest. In this connection we might mention that Mr. Barker has a shop with a good supply of tools, where these things spoken of, as well as a good deal of repairing and general carpenter work required on the farm, is done. There was in connection with the feeding arrangements of this establishment a capital idea carried out, and one which must save a great deal of hard work. Along the passage in front of the cattle there is a tramway laid with wooden rails to the root house, which is about five feet below the level; down this the tramway is laid on an inclined plane, and on it a car is used for the purpose of drawing up the turnips. When filled, it is drawn up by a simple little contrivance which any boy can work with ease. A continuation of the tramway is also laid along the whole length of the stable in front of the cattle's heads, so that five or six bushels of turnips can be moved to the farthest end of the feeding passage with less labour than it would require to carry one bushel. Mr. B. explained to us that if he had his root-houses to build again, he would not have them below the level, but there they were, and he had to make the best of them. One or two small paddocks adjoined the out-buildings, and were nicely fenced with good, substantial board fences, and planted round with maples of a few years' growth. These small enclosures near the out-buildings are useful in many ways, and when planted round, form nice shady spots in hot weather for calves or any other stock which may require to be kept temporarily there, as well as taking away that naked look which is often noticeable about farm buildings. On this farm are all the ordinary implements used by first-class farmers, and rather better kept than first-class farmers usually keep them. No implement is allowed to remain in the field after its work has been accomplished, but is at once taken to the implement shed, cleaned, and put away, so that whenever it is wanted for use it is always clean and bright. Not only that, but it must also result in greatly lessening the expenses of the farm by reducing to a minimum the percentage to be allowed for wear and tear; in proof of which we were shown a drill which had been in use for twelve years, and during that time had not cost ten cents for repairs. Two waggons, one purchased eight years ago and the other twenty-five, were in much better trim than many which are to be seen which have only been in use a season or two. The same with every implement and tool on the farm. It will be readily understood, when such care is exercised in preserving in the best possible shape the implements of the farm, that those vehicles which are required for business and pleasure are in no way neglected. Here was to be seen a waggonette, a lady's phaeton, and a double cutter, which we were informed had been in use for years, and yet looked as glossy and bright as if they had but newly left the maker's hands. The dwelling-house is a large, fine-looking building, well and conveniently laid out, with all the modern improvements, as well as all that is required for a first-class farm house—rooms high, and every part well finished. A furnace heats the greater part of the house with hot air. There is also a large bath-room, the water being raised by a force pump. The grounds around the house are kept in keeping with the building—nice lawn and gravel walks, with a lot of spruce and other ornamental trees; kitchen garden clean and well kept. Taken altogether, this farm indicated good management, and plainly showed that the proprietor was a thorough master of his profession, and that besides being a successful farmer he had tastes which carried him beyond mere money-making. There was at every point signs that the business of the farm was carried out here on a regular system—neatness and order were apparent in every direction. On the farm and in the house was that air of refinement which is so often found lacking amongst our farmers, yet is in no way incompatible with the successfully carrying out of our own pursuits, and tends in such a large measure to make home life in the country enjoyable. There is little doubt but that if more attention was paid to having the surroundings of our country homes made more pleasing to the eye; if some more refining influence could be brought to bear on our home life, perhaps we would hear fewer complaints from parents of their children not taking kindly to the work of the farm. Boys and girls want something else than endless drudgery to make them contented and happy. To Mr. Barker we award the second prize, this being in many respects a model farm.

Having completed our inspection of Mr. Barker's farm, we left again for Paris by the same mode of conveyance by which we arrived; and as we had now for the first time since we left home tested this way of travelling, we came to the conclusion that however much it might be appreciated by amateur pedestrians with light knapsacks, and that however pleasant it might be for ourselves travelling in this way, with the thermometer standing somewhere about 100, it was not at all in the interests of the Association which we represented that our time should be so wasted. Looking at the matter in that light, we at once, on our arrival in Paris, engaged the services of a man and a pair of horses to drive us to the other farms in the county, with instructions to get started as quickly as possible. Well, he certainly was not long in having his rig ready, and getting as far as the stable door; but beyond that point he did not get for the next hour, one of the horses firmly refusing to move one step further. And it was only after various experiments by the horsey men of the town that at last one knowing-looking fellow carried the day—chuckled a little at the other chaps—and we got started at ten miles on our way to the next farm.

MR. MANS' FARM, NEAR PARIS.

Having reached the farm of Mr. John Mans, three miles from Paris, and the weather looking very threatening, our inspection was rather more hurried than it would otherwise have been. We found a good fair average farm, with nothing which would indicate anything exceptional in the way of management. It contains 290 acres, of which seventy are woodland and ten acres, which are wet, and until drained might be termed permanent pasture. There is some clay, but most of the farm is sandy loam, with a limestone gravel and clay sub-soil. There was grown this year thirty-six acres of fall wheat, part of which has been threshed and yields thirty bushels per acre. The varieties grown were "Arnold's Victor" and "Seneca," the latter being the best. The quantity of seed sown was five pecks per acre, which produced a good heavy, bulky crop. There was also sown last fall a new variety of the "Gleek;" three pecks were sown on an acre and a half, which produced forty-five bushels; barley, twenty-five acres; oats, fifteen acres; corn, eleven acres; turnips, four acres; potatoes, one acre; fallow, twenty-two acres; forty-five acres cut for hay, and fifty-five acres pasture, including four acres of orchard. This year there are twenty-nine cattle and fifty sheep on the farm. There are usually kept eight cows, from all of which the calves are raised. The steers are fattened at three years old. Three teams are kept. Two men through the year and a third one for the summer, with extra help in haying and harvest. Wages fourteen dollars per month. The outbuildings are good, comprising two large bank barns, with plenty of stable room. Every accommodation that is wanted for both crop and stock is here. The buildings are also well painted on the outside. The dwelling-house is a large two-story building, built of granite field stone, coursed with freestone corners. The main part of the house is fifty by thirty-six, with large kitchen and woodsheds at the back. The cellars, somewhat larger than the main part of the house, have cemented floors, and are divided into five compartments. Lawn, fences, and everything about the house are well kept, and the whole presents a very fine appearance.

MR. LAPIERRE'S FARM, NEAR PARIS.

The next farm—being the last we had to visit in the County of Brant—was that of Mr. D. B. LaPierre. Mr. LaPierre's farm contains 360 acres, of which about 265 are under cultivation, the balance being 50 acres of woodland and 43 bottom or pasture land. The soil is partly a heavy clay, and the other part a good loam. The ploughing under of clover for the wheat crop is largely followed on this farm. Mr. L. says he is much surer of a good wheat crop after clover than after barnyard manure. No particular rotation is closely adhered to, but the principal course of cropping that is followed is clover, fall wheat, barley, and other spring crops. The difficulty of always following the same system arises from occasionally not getting a good catch of clover. The acreage of the different crops this year was:—Wheat, 80 acres; oats, 40; rye (all of which is used for feed), 20; corn, 4; turnips, 6; potatoes, 3; and hav. 40 acres, and land preparing to be sown with

wheat this fall, 70 acres, all of which was clover ploughed under, 60 acres of which was finished by the 5th of July and the other 10 acres by the 1st of August. The reason that no barley was sown this season was on account of Mr. LaPierre not wishing to have too much work crowding on at one time, as he carries on a mercantile business in Paris, which this summer he foresaw was likely to require a great deal of his personal attention. The wheat crop, taken as a whole, was very good. The varieties were Clawson, Silver Chaff, and Fultz, the latter being the poorest, and the first-named the best. Oat crop exceptionally good. Of the three sorts grown, the Australian appeared to be rather the heaviest, while the Centennial or White Russian was an extra fine sample. The other crops were all good and well forward. The wheat looked like as if it would yield at least 30 bushels per acre. The farm is specially well supplied with water. Besides a never-failing stream which runs through the western part, water can be reached by digging at from four to seven feet on the eastern part. In one place Mr. L. has a pond of spring water fenced off in a small enclosure which is accessible to four fields by simply opening the gates. The stock comprises 10 horses of different ages, 26 cattle, not including 7 milch cows, 72 Leicester ewes, and 28 pigs. The cattle are fair grades, and besides those now on hand, enough will be bought to make the straw into manure. He intends buying this fall 20 head. In the stock line sheep are Mr. L.'s great specialty, the number now on hand being much below his usual average; he prefers Leicester ewes crossed with a Cotswold ram. We were informed that his lambs usually bring \$6 per head. Great care is taken of the woodland, all the fallen timber being cleared out every year, as well as the dead and decaying trees. Besides the means he is using for preserving the timber now standing, a good deal is being done in the way of planting; rows of maples and poplars are being planted along the concession on both sides. This, along with other planting which is being done, must, in a few years, add very much to the beauty and general appearance of the place. The working force includes three teams and an odd horse. Two men are kept steadily, and such other help is hired as required. At the time of our visit Mr. L. was in the midst of his wheat harvest, and a large force was then at work. For the men regularly kept he has houses on the farm. The outbuildings and yards are roomy, good, and well kept, quite sufficient for the requirements of the farm. Stables snug and comfortable, and well adapted for the wintering of stock. The buildings, like Mr. Mans', are all painted outside a dark brown, which improves the appearance, as well as making them much more durable. The dwelling-house is a neat, cosy-looking building, standing amongst a lot of fine ornamental trees, which, along with the other surroundings, form a very pretty picture. Adjoining the house is an exclusively fruit garden, containing apples, plums, raspberries, pears, &c.: in fact, almost every kind of fruit that can be mentioned, and in large quantities; also a fine graperly to the south of the house. After getting through the examination of this farm, the night having set in very rough, with a tremendous thunder storm, at the kind and pressing invitation of Mrs. and Mr. LaPierre, we concluded to stay all night instead of going through to Ayr, as we had intended.

WATERLOO.

MR. EDGAR'S FARM, NORTH DUMFRIES—BRONZE MEDAL.

In the morning Mr. LaPierre drove us to Ayr, where we intended to make arrangements for visiting the farms of Mr. Thomas Edgar and Mr. George Barrie, two of the competing farms in South Waterloo. Here, however, we were met with an unexpected difficulty. The employees of the Credit Valley Railway having struck work, all trains were cancelled, consequently an unusual demand was made on livery stable men, and it was only after a great deal of trouble and the delay of a couple of hours that we at last got on our way to Mr. Edgar's. This we found to be a trim, neat, well-kept farm of 101 acres—83 acres under cultivation and 18 acres in woodland. A regular rotation is followed on this farm, as follows:—First and second year, grass; third, summer fallow; fourth, wheat; fifth, spring grain and roots; sixth, clover, ploughed down and fallowed; seventh, wheat and seeded. The mode of preparing the land for wheat is, in the third year of the course, to give thorough summer fallowing by ploughing deep three times,

harrowing and gang ploughing—the object being to thoroughly clean and pulverize the land deeply once during every course. On the sixth year, the land having been seeded down with spring grain the previous year, the clover is allowed to grow until the second week in June, when it is turned under, the land harrowed, gang-ploughed, and cultivated; then seed furrow. As part of this field will have been in roots the year before, and well manured, a crop of barley is taken off, and then prepared for wheat, so as to bring the whole field into one crop when it is seeded down. At the time of our visit, the field which had been treated in that way was being harvested. It was a good, even, level crop, and, if any difference, rather in favour of that part of the field following barley. The preparation for barley is by ploughing under the tops of the root crops in the fall, gang-ploughing and cultivating in the spring, with 300 lbs. of salt and 100 lbs. of plaster applied before sowing. A bushel and a half of seed is sown to the acre. The quantity of wheat sown is from sixty to seventy pounds per acre. In preparing the land for oats, a light coat of manure is given to the wheat stubble, and ploughed with a jointer-plough in the fall; in the spring the land is worked the same as for barley, with 200 lbs. of salt and 70 lbs. of plaster, with seed at the rate of $1\frac{1}{4}$ bushels per acre. For peas the preparation is the same as for oats, with the exception that no manure, salt, or plaster is used. The reason for plaster not being used is on account of mildew, which Mr. Edgar thinks plaster induces. The acreage this year, and with rare exception, is about the same every year:—Pasture, 10 acres; wheat, 20; barley, 5; oats, 10; peas, 4; hay, 10; turnips and mangolds, $3\frac{1}{2}$; potatoes, $\frac{1}{2}$ an acre; and corn, 2 acres. Of the three varieties of wheat sown this year, the Fultz and Michigan Amber did best. The Clawson had not been threshed yet, but Mr. E. does not think it will yield as well as the others. The oats, Australian and Russian, looked remarkably well. The peas, Golden Vine, sown at the rate of two bushels to the acre. The crops, taken as a whole, were exceptionally good, heavy, level, and clear from weeds, Mr. E. apparently being of the opinion that it is not a profitable way of farming to grow two crops on the land at the same time, one of grain and another of weeds. From ten to twelve cattle are kept, and five or six annually fattened. Average flock of sheep about seventeen, and about the same number, including lambs, fattened. The cattle, like nearly all we had seen where grain-growing was made a specialty, were far behind in quality to those that may be seen in every good farmer's hands in those counties where stock-raising and fattening are more attended to. And it is somewhat hard to account for, that while we found most of the farms we visited well managed and so conducted in almost every department, and such shrewdness and good judgment brought to bear in carrying out every detail of the farm as to ensure the best results, yet we found them, with few exceptions, keeping a mean-looking class of stock, animals from which, "comparatively speaking," little profit could be realized—the weak point apparently not being in the want of attention or good feeding, but simply because care is not taken in the selection and use of good bulls. The fences, private road, etc., good and well kept. The barn, a good bank one, with stable and root-houses underneath. The other buildings included all the necessary buildings which go to make up a first-class homestead; nothing seemed to be wanting; everything well kept; no doors hanging on one hinge, no foul smell arising from some half-cleaned-out stable, but just in such a shape as we expected to find it. After seeing the orderly and trim way in which things were managed outside, they may be summed up as a lot of good, useful buildings well kept—the dwelling-house built of brick; a nice comfortable-looking farm-house, with a good kitchen garden attached, and very pleasant surroundings; also a neat little brick building, which we found to be divided by a partition wall, one part being used for a smoke-house and the other for an ash-house; this building is situated a little way from the house, doing away with all risk from fire, and so constructed as to be rather an ornament than otherwise—rather a contrast to some of the ash-houses that are to be seen. It might be mentioned, before concluding the remarks on this farm, that it will have been noticed that the quantity of seed used in most cases is below what is commonly sown; and without offering to give an opinion on the matter, we may just say that in no case did any of the crops show indications that seed had been too sparingly applied; on the contrary, some of the fields looked as if they would suffer badly with heavy weather.

MR. BARRIE'S FARM—NORTH DUMFRIES.

From Mr. Edgar's we went to Mr. Geo. Barrie's, North Dumfries. It is situated about five miles from Galt, on the Ayr Road, and contains 200 acres—100 on each side of the public road, with a set of good outbuildings on each place. The soil, like a great part of Dumfries, is mostly clay. This land was originally covered with pine; the stumps are now all out, and have been utilized by making them into fences, a good many having been made in that way, and thoroughly good fences they are. As well as pine stumps, Mr. Barrie has had a pretty heavy job in clearing his land from stones, having had rather more than his fair share to contend with. Mr. B. is now adopting a somewhat novel plan of getting rid of them. In former years as they had been gathered from the fields they had been piled wherever it was most convenient—in heaps, or along the bottom of stump fences. Now natural hollows are selected in the fields, and with plough and scraper made deeper, the earth being left round the edges of the place so deepened, and the stones from these piles are then drawn and dumped in. We were informed that as many as five hundred loads had been put into one of these places and covered over with the scraper. This plan seems to be a good one where these natural hollows are convenient—no fear of them ever being a trouble any more, for every subsequent ploughing and harrowing covers them the deeper. The wheat crop on this farm was not as good as we had seen in the other counties gone through. Mr. B. says it is the poorest crop he has had for some years, which may be partly accounted for by the land not being of a nature to withstand the exceptional winter of 1879 and 1880 as well as the lighter and more porous soils of Niagara and Norfolk. From whatever cause, the crop was not a good one, nor yet were the grain crops generally on this farm heavy. The indications were that more stock-feeding was necessary to keep up the manure supply. The cattle fairly good grades. There were a few heifers, which looked like if they might turn out good milkers. It would seem, however, that a much heavier stock might be kept with advantage.

The sheep were rather a good lot and pretty well bred, the Leicester being the breed kept, as it is also chiefly so by the farmers generally in that section. The outbuildings, including bank barns, stables, implement sheds, etc., good and roomy, comprising every accommodation that is required. In one of the barns a hay fork was rigged up with a very ingenious contrivance attached for the purpose of moving the hay, or whatever else they might be handling, to different parts of the barn. To those unacquainted with their use, and whose buildings would be suitable for operating them, it would repay them to go a good long way to see Mr. Barrie's, if none could be seen nearer home. It seems rather strange that so few of them are in use, for where much hay or loose grain of any sort has to be handled in buildings where they can be used or in stacks, the saving of time and labour is very great. The farm implements generally are good and well kept; nothing out of repair. Mr. Barrie, jr., being quite a mechanic, not only attends to the keeping in order, but makes a good many of the implements, as well as attending to the general carpenter work of the farm. The house is a good substantial stone building, with a cheerful, pleasant look about it—just one of those farm houses that takes the eye of the traveller, and in nearly all cases indicates thrift, order and good taste, and just such an one as our town friends think charming and comfortable, and causes them to fancy that they could endure country life if so situated.

MR. RILLENGER'S FARM, WATERLOO.

On leaving Mr. Barrie's, we drove to Galt for the purpose of taking the train to Mosborough, where we intended staying until Monday morning. At Galt we called on Mr. McGregor, Secretary of the South Riding of Waterloo Agricultural Society. He informed us that Mr. George Moore, of Waterloo, had kindly offered to drive us to the different farms in his county. We gladly accepted his offer. Mr. McGregor telegraphing that we would be up by first train on Monday morning. So on Monday morning, taking first train west on the Grand Trunk Railway, we were met by Mr. Moore at Berlin, and at once started for the farm of Mr. Rillenger, situated near the village of Bloomingdale,

in the township of Waterloo. This farm comprises 290 acres, 70 of which are wood. This is a very fine property and fairly well managed. Mr. Rillenger is one of the largest shippers of stock (both sheep and cattle) in Ontario. This takes him away from home most of the time; in fact, we were told that it is quite exceptional to find him at his farm. On the day of our visit he was away shipping a thousand fat sheep for the English market. Such being the case, it was hardly to be expected that we would find things as trim as would be the case if a closer personal supervision was practised. However, it is a good farm and well farmed. The crops as a rule were good and even, and the land clean. The water supply good and convenient. Some wet spongy spots near the buildings stand very much in need of draining, and would well repay the outlay. The buildings, including dwelling-house, are all that could be desired, and well kept. The fences are good and substantial—rail, with upright stakes fastened with wire—quite stock proof. A good deal of stock is fattened here during the winter, all of which has been shipped to the English market since that trade began.

MR. SHANTZ'S FARM, WATERLOO—BRONZE MEDAL.

Having seen what we could for ourselves, we started for the farm of Mr. Silman Shantz. This farm is about two miles from the town of Waterloo, on the St. Jacob's road. This is an exceptionally fine farm, comprising 129 acres, 107 of which are under cultivation, the balance being good timber land. This property cost Mr. Shantz a few years ago \$11,000. We required but a glance at this farm to tell us it was going to mark high, and a close and careful inspection only confirmed our first impression. The soil is a strong clay loam, capable, under good management, of producing heavy crops. The situation is good, being in what is probably one of the finest sections of farming land in Ontario. The crops, without any exception, were remarkably fine. Of the different fields of grain not a single weak spot could be seen. The following is the acreage for this year:—Fall wheat 24 acres, 7 acres of barley, 10 of oats, 4 of spring wheat, 6 of peas, 11 of turnips and potatoes, 21 of hay, 11 of pasture, and 11 of summer fallow.

The different varieties of fall wheat grown this year were, Scott, Clawson and Fultz, the latter being the best, averaging 40 bushels to the acre, the Scott and Clawson yielding 36. The wheat is grown after peas and summer fallow, sown between the 5th and 12th of September, with seed at the rate of six pecks per acre. The summer fallow is ploughed three times deeply, and twice with the gang-plough. After fall wheat, summer fallow or turnips, 11 acres of turnips are grown every year. These are followed by spring wheat or barley, and seeded down with 12 pounds of clover seed; remains in grass two years, when it is broken up and sown with peas. Enough of manure is made to give twelve good loads an acre to 20 acres every year. In the stock line Mr. S. will most likely be heard from at an early date, having laid the foundation of what will be, if he continues in the same way, a fine herd of Shorthorns. At the present time there are eight thoroughbreds—seven females and a bull. They are all good animals, and would take a good place anywhere. Besides the pedigree cattle there are eighteen others, all good animals. The number fattened annually is twelve. The stock is liberally fed at all seasons of the year, and as a result the highest prices are always obtained. At the present time Mr. S. has a standing offer at a high figure for one of his thoroughbred heifers, but has not yet made up his mind whether to take it or not. A flock of about thirty-six sheep are usually kept. This year the lambs have been all sold at \$3.75 per head. The working teams, of which two are kept, are just what are wanted for such a farm—stout, clean-limbed, good stepping horses. Mr. S. keeps his working horses stabled during the summer instead of running in the pasture. He claims that they will stand the work much better, and that it is more profitable. One thing is certain, there has been a great deal of work done on the farm this season, and the horses looked grand, and like as if they were able for a great deal more. The cost of labour, besides Mr. S.'s own work, amounts to about \$180 a year. The conclusion we came to in reference to this farm was, that it was thoroughly well managed. And we also found that the same mistake was not fallen into here that is often to be seen even among good farmers—that is, of making a specialty of certain branches of farm management, and leaving some others rather neglected. But here everything indi-

cated high farming and good management. Fields exceptionally clear from weeds and all obstructions to cultivation; crops heavy and even; buildings, yards, fences and private road in good shape; working teams, implements and machinery all that could be desired for carrying on the work of the farm. The number and quality of the stock, as well as the system of feeding and the management of manure, we considered entitled Mr. S. to mark high.

MR. GROFF'S FARM, WATERLOO.

Our next and last visit in North Waterloo was to the farm of Mr. Abraham Groff, adjoining that of Mr. Shantz. This is a good 180-acre farm, of which 140 are under cultivation, and 40 acres in wood. The soil is a rich, sandy loam, with clay and gravel subsoil. No close system of rotation is followed. About the usual course is to have about one-fifth or one-sixth of the cultivated part of the farm in fall wheat each year, taking the fields that have been longest without manure. From ten to fourteen acres of turnips are grown after wheat or oat stubble manured. This is followed with barley seeded down, grass two years, then broken up and sown with peas and oats. Mr. Groff tries to arrange matters so that one-fifth of the farm will be manured every year. The following is the acreage of the different crops grown this season:—Fall wheat, 27 acres; spring, 4; barley, 13; oats, 11; peas, 6; roots, 10; hay, 33; and 17 acres of pasture. This fall sixteen acres of fallow and six acres of pea land will be sown with wheat. From twenty-five to thirty cattle are kept, and a flock of about thirty sheep. About ten cattle are fattened annually. This stock, both cattle and sheep, while not much to find fault with, could yet be improved very much to the advantage and profit of the proprietor. It might not be out of place to mention here that probably in no other part of Ontario has more been done within the past few years to introduce a better class of stock than has been done in this part of Waterloo. To those who have been in the habit of attending the Provincial and other great shows of the Province for the past few years, and who have taken any interest in the stock department, it will be enough to say that in this part of Waterloo live A. & I. Groff, the Messrs. Snyder, George Moore, and other well-known breeders. The buildings, "with the exception of the house, which is a little too old-fashioned," fences and things generally about the farm, were in fairly good order, and suitable. In concluding our brief remarks on this farm, it may be said that while Mr. Groff's farm is fairly managed, and, as far as we could judge, profitably, yet there is nothing particularly noticeable about it that would take it out of the ordinary run of good, well-kept farms. This closed our inspection of the farms in North Waterloo, and not at all sorry were we for it, for by this time we had found out that to do considerable driving, and to tramp all over, and examine three farms carefully in one day, was no easy task. However, by the kindness of Mr. Moore this work was made much easier than it would otherwise have been.

MR. WALLACE'S FARM, WATERLOO.

Having gone back to our last night's quarters, and having had a good night's rest, we started in good time next morning for the farm of Mr. Wallace, in South Waterloo. The other two farms in that Riding we had gone over the Saturday previous. On our way to Mr. Wallace's we stopped at Jewsburch to see the somewhat noted herd of Shorthorns belonging to the Messrs. Snyder. These gentlemen, as well as being farmers, are extensive millers, their mills being known as the German Mills. They are situated on the Galt branch of the Grand Trunk Railway, about five miles from Berlin. The herd owned by the Messrs. Snyder have been too often in the show-ring and are too well-known to make it at all necessary for us to describe them. We may just say that we found every animal in the best possible shape, and the buildings in which they are kept models of neatness and order. At this place we had somewhat of a mishap. Mr. Moore's horses were left securely tied while we went to have a look at the cattle, but during our absence they had behaved as no well-behaved horses ought to have done; the result being that when we got back they were both lying on the ground, having in some unaccountable way changed sides during the performance they had gone through. Having with some difficulty got them loose and on their feet again, and stock having been taken, we found

that to put matters in right shape again we would require a carriage tongue, a whippetree, a neck-yoke, with a few other trifling things. After a short delay we got under way again, and soon reached Mr. John Wallace's. This farm comprises 180 acres of fairly good rolling land, which at the time of our visit was bearing good average crops. The principal crops grown are wheat, Indian corn, oats, hay, and turnips. At the time of our visit, Mr. Wallace was busy cutting fall wheat, and at the same time had hands at work in his turnip field. This was a good, healthy-looking crop of turnips, had been well put in, and were being well cleaned. The buildings, including dwelling-house, are quite superior to the general run of farm buildings—large, roomy, well constructed, tidily kept, and suitable for the different purposes for which they are required. Private roads and fences passable. Stock rather inferior. On the whole a fairly well managed farm.

HALTON.

MR. BUSSELL'S FARM, TRAFALGAR.

Having now gone over all the farms excepting those in Halton, we returned to Guelph, and next morning left by the Grand Trunk Railway for Milton. Here we were met by Mr. Tuck, one of the Directors of the Halton Agricultural Society, with whom we at once started for the farm of Mr. J. M. Bussell, near Hornby, in the township of Trafalgar. The buildings on this farm are reached by driving through a very fine avenue. This was such a fine entrance, and lined with such fine timber on either side, that our expectations were raised too high, and we have to confess to feeling a good deal disappointed at not finding things a little neater at the other end. The dwelling-house was good, but there was a roughness about the yards and surroundings of the outbuildings, and the buildings, although large, were so inconveniently arranged as to detract very much from what they might have been if the same outlay had been more judiciously expended. The crops on this farm were inferior; the fields badly overrun with thistles; fences and private road passable; stock inferior. This farm should not have been entered for competition.

MR. CAMPBELL'S FARM, TRAFALGAR.

From here we went to Mr. D. W. Campbell's, in the same township. On going to Mr. Campbell's we passed for a greater part of the way through a very badly-farmed district. There was, of course, exceptions to this bad farming, but, speaking generally, it might be said to be one bed of Canada thistles most of the way. And how men can make that sort of farming pay must be a mystery to those who live in better tilled districts, and yet find very little in the shape of profit left at the end of the year. On reaching Mr. Campbell's we found a very different state of things to what we have just been describing. Here was to be seen heavy crops and clean land. This farm contains 400 acres, 220 of which are under cultivation—65 acres of woodland, 65 permanent pasture, and 50 acres which has just been brought in, and may be termed new land. One hundred and twenty acres of the cultivated land is comparatively new, having been brought under cultivation at different times during the last three years, and on this account a much larger acreage of fall wheat has been grown than would have been under a regular rotation of crops. Eighty acres was grown this year, 74 of which was new land. The soil is a deep sandy loam, with a subsoil of gravel. A good deal of draining has been done where it was found to be necessary, and as a result there was an absence of short, stunted-looking pieces of grain, such as are too often seen on sour lands. Owing to so much of the land being lately brought under cultivation, Mr. C. has not yet got into a regular rotation of crops. He, however, adopts the plan of sowing seeds on all the grain crops, and consequently has a great deal of clover to plough under; sows plaster and salt on all the grain crops and hay land. The acreage of the different crops this year was: Wheat 80 acres, 35 acres of barley, 35 acres of oats, 45 of hay, 10 acres of turnips, $5\frac{1}{2}$ of corn, and $4\frac{1}{2}$ of potatoes. The most of these crops would yield well, all the grain at our first visit being either ready for harvesting or past danger of injury from the weather. One field of turnips looked very forward, and had been well attended to. At our second visit, on the 9th of September, this field had received no check, and gave pro-

mise of being an exceptionally heavy crop. Another field at the opposite side of the farm was not looking so well, and had a patchy, uneven look about it. The young grass at our second visit was better than any we had seen, so rank and strong that it would hardly be safe to risk it without being partly eaten down. A winter of heavy snow would be almost sure to rot it. Cattle raising and feeding is carried on to a considerable extent by Mr. Campbell. The pedigree stock consists of sixteen Shorthorns, most of them being very fine animals. This herd suffered badly last year at the time the buildings were burnt down on this farm. At that time twenty-six were burnt to death. Besides the thoroughbreds, there are thirty-seven good grades. Last winter thirty-three head were fed for the butcher. We were shown here the nicest pigs we had seen. They were Sussex, and very good specimens of the breed. These were enjoying life in a very complete and well-built piggery, twenty-eight of them in all. A noticeable feature on this farm are two very fine orchards—one having been planted about eleven years with 450 trees, and the other seven with 500 trees; besides these there is another smaller one of older date. These are very fine, healthy orchards, and the trees are either Kusset or Northern Spy. The outbuildings, which were burnt down last year, have been rebuilt exactly on the plan of those destroyed. They are very extensive and well constructed. As they now stand they form two sides of a square; the other two sides Mr. C. informs us he intends building up at an early day. The buildings now up are two barns—one 56 by 108, and the other 36 by 60, with stone foundations 11 feet high. Under this building is a good spring, which forms the water supply for the stock. Hog pen 30 by 60, and horse stable 30 by 60. A large number of cattle can be comfortably housed in the stables, which are fitted up with open and box stalls. The feed for the cattle is all cut, and in the winter it is mixed with pulped turnips and bran. It may be added that the buildings are all painted, and fitted up with cave-troughs, ventilators and everything that is required to make a thorough finish of a most complete set of farm buildings. The dwelling-house is a good useful farm-house, pleasantly situated near a very beautiful piece of second-growth pine on the one side, and at the back are the rugged banks of a ravine descending for 100 feet or upwards to a stream below. The labour is performed by five men in the summer and three in the winter. These men are boarded by the foreman, who has the general superintendence. Mr. Campbell living in Milton, only spends part of his time on the farm. The weak point of this farm is the general appearance of ruggedness in every direction. This partly arises from two causes. One is that the land having been originally covered with pine, the stumps have been utilized in making fences. These fences have been very roughly put up, and the fields being of an uneven size, makes them look worse than they would have done if they had been in continuous lines across the whole farm. Another reason is that a great deal of the land until the last two or three years was unoccupied, and although Mr. C. has spent a great deal of money in improving it the last few years, it is impossible to get a farm covered with pine stumps in good shape in so short a time. However, with the drawbacks alluded to, we consider this farm managed in a superior way. The general appearance of what we saw indicated high farming—good crops, clean land, good stock, and first-class buildings, with a healthy, thriving look everywhere.

MR. FOTHERGILL'S FARM, TRAFALGAR.

From here we went to Mr. Fothergill's, near Burlington, in the township of Nelson. We reached Mr. Fothergill's about 8 p.m., having during the day inspected two farms and driven over forty miles. Next morning we were up early and commenced work, both of us being anxious to get through, so as to leave for our respective homes by the forenoon train, feeling a little anxious while we were criticizing other people's farms to know how our own affairs were getting on at home. To begin with, it may be said this farm of 210 acres is very favourably situated. The location is a very fine one, close to the lake, within ten minutes' walk of railroad communication in every direction, within twenty minutes' travel by rail by either the H. and N. W. R. or the G. W. R. to Hamilton, or an easy distance to drive. As well as being pleasantly and conveniently situated, the appearance is very fine as seen from the public road or the H. and N. W. R. Not only that, but what is even of still more importance to the proprietor, it is, if not the best, one of the best farms in the

county. It comprises 210 acres, of which 30 acres is woodland, is divided nearly in the centre by the G. W. R.; fortunately the railway runs parallel with the front of the farm, and the fields are not in that way left in gores. The farm is level or nearly so; the whole can be seen from any point with the exception of one field, which lies at the extreme end of the farm, and is cut off from the rest of the cleared land by the wood. The soil is mostly a dark loam, easily worked. The back part of the farm is more inclined to sand. The water supply is exceptionally good, being supplied by a spring creek, so dry to the edge of the stream that there is hardly any waste land excepting where the water runs. The greater part of this farm has been under-drained, so it can be now worked at any season of the year when the frost is out. It cost the present owner at the time he bought, it three years ago, \$20,000 in cash, besides which he has spent in building \$2,000 or more. Mr. F. has not got his farm into regular rotation yet; he usually ploughs clover under, and summer fallows for fall wheat; ploughs up sod for corn, barley following; barley also follows the root crop; seeds down with barley, and leaves the grass for two years. This season the oats were sown on sod which had been down a good many years. The average of the wheat crop was 35 bushels. At our second visit they were busy with a steam thresher threshing out the barley. As some of it was yet to do, it could not be said how it would yield, but Mr. F. thought from what had been threshed that it would turn out forty bushels of well-cleaned barley to the acre. Having seen it at the time it was harvested, we did not think he was overestimating it. Thirty-one acres were cut for hay, and 16 acres are in turnips. The turnips look very fine and promise to be a heavy crop. Ten loads of barnyard manure and 300 lbs. of superphosphate were applied per acre to this crop. Mr. Fothergill's own experience leads him to place a good deal of value on superphosphate as an artificial manure when placed on the turnip crop. Perhaps the finest crop on this farm was corn. It was so good that it was difficult to imagine anything much better. Coming to the stock, we at once see that this is Mr. Fothergill's strong point. His herd of Shorthorns only includes twelve animals, but out of these can be selected at least six good show animals. These are being specially prepared for the fall exhibitions, and have been entered for both the Toronto and Provincial Fairs. Previous to our visit the finest heifer (a two-year-old) had died. This was the more unfortunate as there was not time to get another in good shape to make up the necessary number for the herd. Besides the thoroughbreds there are twenty-five grades—a good strong lot. Twenty cattle and thirty sheep are fattened annually. All the fodder is cut with a horse-power chaff cutter, and the turnips are pulped; bran and meal are also freely used. Mr. F. places a high value on bran as a cattle food when mixed with meal. It was noticeable that this plan was carried out on every farm that we had gone over wherever stock-raising and feeding were much attended to. They all agreed on the one point, that the cost of the labour was much more than repaid by the advantages and saving resulting from that system of feeding. It was noticeable at Mr. Carpenter's and Mr. Campbell's, as well as in the stables of the gentleman we are now writing about, that in fitting up their extensive and costly buildings, no provision was made for feeding in any other way, plainly indicating that they at least had no doubts in regard to the economy of the plan they were following. A flock of sheep is usually kept. Those on hand are a good fair lot of Leicesters. The buildings here, like those at the last farm we were at, were exceptionally fine, extensive, and well finished. Painted and fitted up in the most convenient way, they form a very superior lot of farm buildings. Like Mr. Campbell's, they are all fitted up below for stock, the stone stables being high, well lighted and ventilated. Here also the water supply is under cover, from whence it is supplied to the stock both in the yard and in the stables. Beside root houses, chaff bins, etc., there are stalls for thirty-six cattle, and loose boxes for twenty. The horses we found to be good, useful-looking animals. One pair, which are used for the heavy work of the farm, are fine specimens of heavy draught horses. The implements and machinery good and well kept. Fences generally passably good. Along the roadside a good, straight wooden fence. Private road fairly good. The dwelling-house with its surroundings form a very attractive feature. It is built of brick, two storeys high, with the necessary attachments of kitchen, woodshed, etc. The design is a very nice one. It is well and conveniently laid out, and finished in first-class style. In getting up the plan the requirements of a farm house have been well considered.

The cellars, of which there are three, have cemented floors, are well lighted and ventilated, and are the full size of the house. The grounds are very prettily laid out, the house is partly covered with ivy, and with its surroundings forms a very pretty picture—probably, taken altogether, one of the finest farm steadings in Ontario. The conclusions we came to in reference to this farm were that it was a good farm and well managed; that a great deal of money had been judiciously spent in permanent improvements, particularly in carrying out a complete system of under-draining, and in putting up good and useful buildings; that it was well and conveniently laid out in fields of a size suitable for a farm of that extent; that teams and implements were well kept, and cattle very superior, and that the general appearance was very fine. The only noticeable offset to what we have said is the rather dirty state of some of the fields at the back part of the farm—those having rather more Canada thistles in them than is exactly in keeping with high farming and good tillage. Nevertheless, after making what we consider due allowance for this, we consider this the best managed of the three farms entered for competition in the Riding, and award to it the Riding prize.

THE AWARDS.

The following are the awards we have made. These awards, as far as the Riding prizes are concerned, were, with one exception, settled at our first inspection, which took place between the 5th and 15th of July. Before coming to a final decision in regard to who were entitled to the gold and silver medals, we thought it better to make a second visit to those farms which we had marked highest. This we did, beginning on the 9th and finishing on the 13th of September. We may also add that the impressions we formed on our first visit were, in nearly all cases, borne out in our second:—

First Prize—Gold Medal—J. B. Carpenter, Township of Townsend, N. R. of Norfolk. Second Prize—Silver Medal—Chris. Barker, Township of South Dumfries, N. R. of Brant. Bronze Medal—H. and J. Hutchison, Township of Niagara, Niagara. Bronze Medal—H. Frinder, Township of Woodhouse, South Norfolk. Bronze Medal—Thomas Edgar, Township of North Dumfries, South Waterloo. Bronze Medal—Tilman Shantz, Township of Waterloo, North Waterloo. Bronze Medal—John Fothergill, Township of Nelson, Halton.

In the case of H. and J. Hutchison, of Niagara, we consider their management so very superior that we would suggest that the Association award to them a silver in place of a bronze medal. If it is considered well to do so, we would further suggest that the Council of the Association take into consideration the advisability of offering at the next competition two silver medals instead of one.

Another suggestion we would make is, that it might be better to make some change in regard to the time at which the judges have to perform their work. It is presumed that, as a general rule, men will be selected as judges who are themselves more or less actively engaged in farming operations. To such there is no season of the year in which they sustain more loss in being absent from the farm than for the week or two beginning with the early part of July. Such being the case, might it not be well that the time should be changed to, say, a fortnight earlier?

In conclusion, we may say that we have particularized somewhat fully the methods of management adopted on the prize farms, because, sound principles being first acknowledged, it is attention to details that, in a large measure, ensures success in agricultural matters. At the risk, therefore, of being tedious, the detailed description will, we trust, be more serviceable than if curtailed to a simple statement of results.

And we trust that we will not be charged with going beyond our province, or of introducing irrelevant matter, if, after having had an opportunity of personally observing the interest which has been taken in those sections where the competing farms are situated, we state what we believe to be the advantages resulting from these farm competitions. We have good reason to believe from what has come under our observation that the Council of the Provincial Association has taken a wise course, and one that is likely to stimulate and advance the interests of agriculture, and that probably more good will result from it in advancing the material interests of the country than the expenditure

of an equal amount of the Association's funds in any other direction. In saying so much, we do not wish in any way to undervalue the great good which cannot but result from the largely-attended fall gatherings of the Provincial Association. But from the stir and bustle incident to such occasions, and the multitude of objects which press upon the attention at the same time, they are hardly calculated to have a lasting impression upon the mind of the agriculturist with respect to any advantages he might derive from the proceedings in connection and comparison with his own practice at home. It is neither the proceedings of a day, a week, or even a year that will accomplish the introduction of an improved system of agriculture amongst farmers, but they must have for a series of years a steady example set before them, bearing the impress of experience and practice, before they will deviate far from their usual methods of cultivation; and it is quite possible for individuals to be connected with Agricultural Associations, and even be successful exhibitors for many years in particular departments, and yet be in a great measure ignorant of some of the most important matters connected with modern agricultural improvement. We found in the various counties in which our work lay that an interest was taken in this farm competition—that discussion was being carried on, and comparisons being drawn which cannot but be favourable to the interests of agriculture. We also found what it would be well for every farmer to know—that in all cases the higher the farming the more satisfactory the results; the more liberally the farm was dealt with, the more bountiful the returns.

From what has come under our notice while making a close and careful examination of the different systems and modes of farm management, we feel that we are warranted in drawing the following deductions:—

1. That wise and liberal management will produce eminently satisfactory results.
2. That high farming is not only conducive to the interest of the farmer, but to the public also.

We see this exemplified in the case of Mr. Carpenter, with his high system of farming, requiring a great deal of labour—this labour being always required, comfortable houses are provided for the men, and this must be a boon to the occupants. Not only that, but in all cases where we found the highest class of farming followed, we found that of a necessity there was the largest expenditure, consequently the most good to the general public. And we certainly saw no reason to doubt that the large returns produced from such liberal expenditure were anything but profitable to the parties most interested. And it will be readily admitted as a self-evident fact, that the greater the average returns, so long as the cost is not increased, the greater the boon to the general consumer.

JOHN J. HOBSON.
CHARLES DRURY.

The following are the farms entered for the above competition:—

ENTRIES FOR FARM PRIZES.

NAMES.	LOT.	CON.	TOWNSHIP.	POST-OFFICE.
Niagara—James Omond.....	.....	.....	M. R. Niagara.....	Niagara.
“ S. Shearer.....	65	3	Niagara.....	Niagara.
“ H. and J. Hutchison.....	26	2	Niagara.....	Niagara.
S. Norfolk—R. Frinder.....	5	Gore.	Woodhouse.....	Simcoe.
“ W. Dawson.....	17 and 18	3	Charlottetown.....	Victoria.
“ J. Dunkin.....	20 and 21	3	Charlottetown.....	Victoria.
N. Norfolk—J. K. McMichael.....	9 and 10	6	Townsend.....	Waterford.
“ J. E. Carpenter.....	1 and 2	13 and 14	Townsend.....	Simcoe.
“ J. H. Wooller.....	1, 2 and 3	13	Windham.....	Simcoe.
N. Brant—Chris. Barker.....	.....	.....	South Dumfries.....	Paris Station.
“ Louis D. B. LaPierre.....	.....	.....	.....	Paris.
“ John Maus.....	.....	.....	.....	Paris.
S. Waterloo—Thomas Edgar.....	.....	.....	N. Dumfries.....	Ayr.
“ George Barrie, Jr.....	.....	.....	N. Dumfries.....	Galt.
“ John Wallace.....	.....	.....	Waterloo.....	Strasburg.
N. Waterloo—Joseph Rillenger.....	7 and 6	8	Waterloo.....	Bloomingtondale.
“ Tilman Slantz.....	9 and 6	.....	Waterloo.....	Waterloo.
“ A. Groff.....	9 and 6	2	Waterloo.....	Waterloo.
Hutton—James M. Bussell.....	13	9	Trafalgar.....	Hornby.
“ John Fothergill.....	17	3	Nelson.....	Freeman.
“ D. W. Campbell.....	36 and 31	2	Trafalgar.....	Milton.

The Council having been well pleased with the report and decisions made by J. J. Hobson, Esq., and Charles Drury, Esq., the Judges for 1880, they were again unanimously appointed for this year, and were requested to look over the farms that were entered in Group No. 2, consisting of the following Electoral Districts—Essex, Kent, Lambton, Middlesex, Elgin and Oxford, with their respective Ridings. The same rules to govern the Judges as given in 1880. Their able report is given below.

REPORT OF THE JUDGES ON PRIZE FARMS, 1881.

Having for the second time been appointed Judges of Farms entered for competition for the prizes offered by the Council of the Agricultural and Arts Association we at once made arrangements for commencing our work as soon as possible after the time specified for us to begin—the 20th of June. Accordingly, on the 24th we met in Guelph, and took the afternoon train by the Great Western Railway for Chatham, arriving there in the evening. We were there fortunate in meeting Stephen White, Esq., the representative in the Council for that division; he at once offered to take us in hand, and in a few minutes had the plan of next day's work laid out. Accordingly next morning, punctual to appointment, we started for the first farm to be visited in the West Riding of Kent, that of Mr. A. Dolson, situated one mile west of Chatham, comprising 230 acres; besides which, he works in connection with it 100 acres more. The farm which was entered for competition is bounded on the north-west by the River Thames—the river also being the boundary between the townships of Raleigh and Dover East—and on the south-west by the Great Western Railway. This farm, like most of the land in the township, is nearly level; the soil a rich clay loam, with a clay subsoil easily drained.

The average of the various crops this year are: Fall wheat, 80 acres; barley, 10; corn, 12; hay, 90; wood and pasture, 38 acres (along with the hay and pasture are also included the orchards, comprising 26 acres). In carefully going over the fields we found, as a rule, the crops heavy and good, with this exception, that some of the fields of wheat had been somewhat winter-killed, although not to such an extent as to materially affect the general average, which, from present appearance, might be safely put down at 30 bushels an acre. The varieties grown are Scott and Fultz. Barley good, but not sufficiently advanced as to warrant us in making an estimate of the yield. The average yield of barley on this farm for a number of years past has been fully 35 bushels an acre. Coming to the corn, we found it very backward, owing to the long continuance of cold weather in the spring; so backward, indeed, that it would appear almost certain that that crop must be a comparative failure. Hay a good crop, with a probable yield of two tons per acre—and we might here remark that Mr. Dolson is a strong believer in the importance of "making hay while the sun shines," for, at the time of our going over his fields, he had a couple of mowers at work drawn by two pairs of smart-stepping horses, and in an adjoining field, which had been cut a day or two before, a little darkey was mounted on an American hay tedder, tossing and shaking the hay at a rate and in a manner which could not be equalled by five or six men. In regard to pasture and wood land nothing much can be said, excepting that the wood land would have looked none the worse if it had been a little better cleaned up.

The stock of cattle, with the exception of three pedigree Shorthorns, we considered inferior, and rather out of place on such a fine farm. The number usually kept in the summer is fifteen; this also seemed to us a very small stock for such a large and productive farm. In the fall from 20 to 40 steers are usually bought; these are wintered over in the straw-yard, and sold in the spring for grazing—a plan which many of our farmers who live in those counties where fattening is carried on to a greater extent would hardly consider was the way to make the most money out of them. The rotation which is usually followed is to break up the sod and sow corn or beans, then in the fall plough the land, and in the spring prepare with cultivator and harrows for barley; barley land manured and sown with fall wheat; clover is also ploughed under for fall wheat. No turnips or oats are grown, Mr. Dolson considering it more profitable to grow corn for both cattle and horses. This question of feeding corn solely to both horses and cattle, in

preference to either oats or turnips, is one that might be well worth discussing by a farmers' club, if there is one in that neighbourhood—for there is, no doubt, room for a pretty strong argument on the other side. Going to the implement shed, we found everything that was required on such a farm, and some things which are not often seen even on large farms; one being a hay-press, used for the purpose of baling hay—the surplus hay grown on this farm being sent direct from the farm to the larger markets, thereby saving the expense of a second handling; and, as before mentioned, a hay tedder, a most valuable machine on any large farm, by its use not only saving the cost of a great deal of labour, but doing the work in a manner altogether superior to what it can be done by hand labour, shaking it well out and leaving it lying so light on the land that wind and sun will dry it rapidly, and, as all good farmers know, many a crop is badly spoiled through not being able to draw it in a few hours earlier. Another machine was a hay-loader. This we expected to have seen at work, but, unfortunately, a shower of rain coming on prevented its being used. We were told that it worked well, and evidently from its appearance it had been a good deal used. Fences and private roads passably fair. Barns, sheds, &c., somewhat irregular, and not very capacious-looking for the size of the farm, and would be none the worse for a little fixing up. Orchards large, healthy-looking, and splendidly kept. Kitchen garden well attended to, and containing a good supply of all the ordinary vegetables and small fruits. Considerable planting has been done some years ago, as shown by fine rows of young maples at each side of the private road running through the farm, as well as a magnificent row of evergreens planted eighteen years ago on the road-side; these, as well as being beautiful to the eye, answer the purpose of a wind-break to the orchard. The dwelling-house is a large, costly, roomy building, built of brick, showing good taste in its design, and with its surroundings of cedar hedges, groves, and lawns beautifully kept, forms such a residence as is seldom seen away from the larger cities. The number of men kept are two by the year, four more during the summer, with a lot of extra help during haying and harvest, generally at that time having altogether from twelve to fourteen men. The men engaged by the year receive \$220, free house, keep of cow, firewood, and land for vegetables. The other labour costs on an average \$1 per day. No men are boarded in the house. Five pair of horses are required for the work of the farm. At the time of our second visit we found considerable improvements had been carried out: Weigh scales, with building over them, so as to allow loads of hay to be driven through and weighed. A large and well-constructed tool-house had been built. The stubble fields we found to be free from weeds. The Indian corn crop had pulled up in an extraordinary way, showing in a marked manner the corn-producing power of the land; it is now estimated at 60 bushels an acre. The eighty acres of wheat had been threshed, yielding over 2,600 bushels. Everything on this farm went to show that it is remarkably productive, and whatever theories may be advanced in regard to the importance of heavy manuring, we have every reason to believe that in this particular case the soil is in no way lacking of what is essentially requisite in producing heavy grain crops, and that the management in many respects is thoroughly good. And we award to Mr. Dolson the second silver medal.

MR. SMYTH'S FARM, HARWICH, EAST KENT.

In the afternoon we were taken by Mr. Smith, President of the Kent Agricultural Society, to the farm of Mr. James Smyth, one mile and a half south-east of Chatham, on what is known as the Communication Road, part of the farm lying on each side of the road, comprising in all 100 acres. The soil is a good clay loam. The farm is well watered by the McGregor Creek and by wells. The crops grown this year are, 22 acres fall wheat—this, a good crop, will yield probably 35 bushels per acre; 16 acres of barley, looking well; corn, 18 acres, which, like all we had seen, was backward; about 2 acres of turnips. Mr. Smyth generally grows carrots, but has none this year; 3 acres bush; balance pasture. Twenty head of cattle are kept, and from three to six fattened annually on hay, corn, and roots; cattle are good, and evidently bred with an eye to being good milkers. Two span of horses and one odd one are required for the work of the farm. Rotation, and the plan of preparing the land for the different crops, is similar to that followed by Mr. Dolson, and apparently with good results. The method of applying the

manure is to spread it on the land immediately before sowing, and work it well in with the harrows. Mr. Smyth claims that he has tested the different ways of applying it, frequently in the same field, and invariably found the best results follow top-dressing.

It will be remembered that Mr. Barker, near Paris, one of last year's competitors, and one of the best farmers in the country, after having thoroughly tested on his own farm the different methods, like Mr. Smyth, found the best results follow when spread on the surface. Without offering an opinion, we would suggest that, as it is one of those disputed questions, it would be well worth the trouble for farmers to try careful experiments on their own farms, and judge for themselves what is the best plan to adopt in their own particular case. The published results of carefully-carried-out experiments by some of our best practical farmers would be worth a whole volume of theorizing. However, it must be borne in mind that to be of any value the experiments require to be carefully and accurately conducted. There has been considerable draining done, and the farm is in very good shape in every respect, Mr. Smyth evidently being a good, practical, money-making farmer.

MR. PARKS' FARM, MALDEN, SOUTH RIDING OF ESSEX.

After getting through with the inspection of Mr. Smyth's farm, we were driven by Mr. White to Charing Cross Station, on the Canada Southern, where we took train for Amherstburgh, reaching there at 7:30 p.m. It being Saturday night, we remained there until Monday morning, when Mr. Armytage, the Secretary of the Essex Agricultural Society, drove us to the farm of Mr. Thomas Parks, six miles south-east of Amherstburgh. It having rained heavily during the whole night, we found the roads very heavy and muddy, with the exception of the Talbot and Amherstburgh road, on which we travelled four miles on our way out. This is a very fair road in a section of country where it is difficult to get the material to make good roads, both stone and gravel being scarce, and in most cases far to draw. On reaching Mr. Parks' farm, we were fortunate in finding him at home. We found him to be apparently a pushing, active, go-ahead farmer, well able to give a good reason for all he does.

The farm is 149 acres, partly clay loam, the remainder gravelly loam; 110 acres cleared, the balance bush. Here, as in Kent, we were rather surprised to find such a large quantity of fall wheat grown in proportion to the size of the farm, 36 acres appearing to us a large quantity on a farm with 110 acres cleared. In this case the crop did not look very well, and showed signs that the land had been rather heavily drawn upon: 22 acres of corn—part of this was healthy-looking and forward for the season; 8 acres of oats; 20 of hay—a fair average; 7 acres of orchard, with the balance of cleared land pasture. Some draining has been done, and more is required, and would have been done had it not been for expense of getting tile—two-inch tile costing from \$8 to \$9 a thousand, and at that price has to be drawn fifteen miles, Essex Centre being the nearest point at which tiles can be got. Fifteen to twenty cattle are usually kept; these are an average lot. A flock of twenty ewes, with their lambs; these are well-bred Leicesters, and are a very fine flock, being decidedly the best lot of sheep that we had so far seen in either Kent or Essex. Not much is done in fattening, three or four cattle being the usual number sold for beef during the year. The principal crops are fall wheat and clover, the latter being principally depended upon for keeping up the fertility of the soil. It is, however, more than doubtful if this can be depended upon much longer to take the place of barn-yard manure. We fancied we saw plenty of evidence in this part of Essex to warrant us in drawing the conclusion that there is something radically wrong in the system of farming. Garden and orchard in fair shape; buildings passable; fences pretty good. In concluding our remarks on the only farm entered for competition in Essex, we would say that while Mr. Parks is no doubt an active, pushing man, there is nothing whatever about his farm management which would take it out of the run of fairly well-managed farms.

On leaving, we were taken by Mr. Armytage a different way back to town, calling at his own farm, where we were kindly invited by Mrs. Armytage to stay to dinner. That very necessary part of the day's programme having been got through with, we had a look at his stock and farm, and soon saw evidence that Mr. Armytage farmed in a manner very superior to the general Essex farmer. Here we found well-tilled land, capital buildings, and first-class stock. Among the stock is a fine young bull purchased

from Mr. Curry, of Eramosa, County of Wellington; and it seemed to us perfectly incredible that farmers living around him should be content to go on breeding the miserable-looking animals which are to be seen in every direction, after having a chance of seeing for themselves the advantage of paying more attention to the crossing of their mean-looking cows with a full-bred bull. In regard to the farming of that part of Essex through which we passed, it may be described as very inferior. Perhaps this may be accounted for by being largely settled by French Canadians, a people who, as farmers, are not noted for being very progressive, but are a little apt to cling tenaciously to the idea that what their grandfathers did is exactly the right thing for them to do at the present day. But, while little can be said in favour of their farming, it is only just to say that there was plenty of evidence that they are a thrifty people, and by no means lacking in good taste; plenty of evidence of that was to be seen in their nicely-painted and cheerful-looking houses and well-kept gardens.

Leaving Mr. Armytage's, we had a sharp drive to the station, managing to reach there the minute the train was due to leave; but as trains will sometimes be irregular, we found we had plenty of time to spare, and at forty minutes past the time due to leave we started on the mid-day express of the Canada Southern for Charing Cross, making the distance—fifty-four miles—in seventy minutes. On reaching the station, we found our obliging friend, Mr. Stephen White, on the platform, and in less than five minutes we were on the road, behind a pair of fast-stepping horses, on our way to visit the two farms on the Talbot road—the nearest, that of Mr. Mills, being eight miles distant. Nothing could be more enjoyable than the drive—good horses, good road, with splendid fields of fall wheat on either side, and lastly, the good fortune we had in having Mr. White with us, who, having lived here a lifetime, knows everybody and everything that is worth telling about that part of the country. But, however interesting it might be to us, it is hardly the matter we were sent out to report upon, so we will pull up sharp, and return to the work on hand. Well, after driving four miles on the town line road between Howard and Harwich, we reached Buckhorn, on the Talbot road; from there we drove four miles to the farm of Mr. Jesse Mills. This road runs parallel to and in sight of Lake Erie, dividing the farms which run a mile and a quarter back, giving each a lake frontage. We could hardly fancy anything finer for farming purposes than this stretch of country lying well up from the flat lands, with a somewhat sharp but exceedingly productive soil, splendid natural drainage, good supply of pure water, naturally well adapted for fruit-growing. In regard to the latter, we were told on good authority, by men who have travelled extensively in the fruit-growing districts of both Canada and the United States, that some of the orchards here for productiveness and quality of fruit are unsurpassed in either country.

MR. JESSE MILLS' FARM, RALEIGH, WEST KENT.

The situation and general appearance of this farm is very fine, and from our way of looking at it none the worse for being washed by the waters of Lake Erie, although from Mr. Mills' standpoint it is in some ways a little objectionable, for during the present season from half to three-quarters of an acre had been undermined and dropped into the lake, carrying with it trees not less than sixteen inches in diameter. This farm consists of 200 acres; soil sharp, and inclined to gravel; produces good clover, wheat, and Indian corn. The mainstay of this farm, like others we had visited in that section, was ploughing under clover, although in Mr. Mills' case this source of manure supply is more largely supplemented by barn-yard manure than is usually the case on the surrounding farms. The rotation is a simple one, but is evidently well adapted to the circumstances of the farm: Clover ploughed under for wheat; oats follow wheat; corn after wheat or oats; wheat is sometimes sown on oat stubble, manure being applied on the surface after ploughing. Corn here takes the place that the pea crop takes in some other parts of Ontario, and is extensively grown. As in other parts of Kent, the acreage of wheat is large in proportion to the whole farm; oats are grown to a limited extent; barley not extensively; beans (the small white) are sometimes grown on this farm as a field crop; they sell readily, and as the soil is well adapted for them, they are found to be highly profitable. A few

carrots and mangolds are grown, and the land for these crops being heavily manured, the result is generally a very heavy yield, last year 1,000 bushels of carrots and mangolds having been taken off one and a quarter acre. The acreage of the different crops this year was: Wheat, 34 acres; oats, 9 acres; corn, 10 acres; hay, 14 acres; in pasture, 33 acres. Mr. Mills furnished us with the following statement in regard to the yield of the different crops for the past two years. This return will give a fair indication of the productiveness of the soil under its present management:—In the year 1879 there was grown 19 acres of hay, yielding 40 tons; 28 acres of wheat, yielding 950 bushels; oats, 10 acres, yielding 580 bushels; corn, 16 acres, yielding 860 bushels; and one acre of roots, producing 600 bushels. In 1880 there was grown 15 acres of hay, yielding 20 tons; wheat, 32 acres, 1,250 bushels; oats, 17 acres, 750 bushels; corn, 10 acres, 1,150 bushels; roots, one and a quarter acres, 1,000 bushels.

About eighteen cattle are kept. Two of the cows are good pedigree Shorthorns. Six thoroughbreds were sold this spring. The cattle are a good lot, showing good judgment in breeding, as well as liberal feeding. A few pigs are kept. The horses are exceptionally good. Some very fine colts are bred. Mr. Mills' plan of feeding his working teams is to feed with cut oat sheaves all the year round; he considers it preferable to turning on to grass, as it keeps them hard and well up to their work. Two teams are kept for the work of the farm; besides these a useful-looking driver. The fences on this farm are in fair condition; buildings medium; the grounds surrounding the house tidy and well kept, giving it a very neat appearance. We would set down Mr. Mills as a first-rate farmer, and we consider his system a good one and highly profitable.

MR. SANDERSON'S FARM, RALEIGH.

This farm of 200 acres is of a soil similar to the last one described; it is also situated on the Talbot road, with a lake frontage. The rotation of crops is clover, wheat, barley, corn, and oats. Land is seeded down each time small grain is sown—that is, other grain than Indian corn. The acreage of the different crops this year was: Wheat, 48 acres—would probably yield 30 bushels per acre; corn, 14 acres—this crop was very backward; oats, 8 acres; hay, 38 acres; 16 acres of orchard. The hay crop was good, and would average about two tons per acre. Fruit-growing is quite a specialty with Mr. Sanderson. His orchard is a very fine one; the trees are chiefly Northern Spies, and are very healthy-looking. In the year 1879, 700 barrels of apples were sold from this orchard; and last year 428. This was shipping fruit, and besides this there was considerable fruit which was not good enough for shipping. At the time of our visit there was the prospect of a heavy yield this season; but since then we have heard from Mr. Sanderson, and he informs us that the long spell of dry weather has seriously affected the crop, and he does not expect to have more than 400 barrels from this year's gathering. A considerable quantity of clover seed is grown—some years as much as 120 bushels. About twenty cattle are kept; these appear to be a cross between Durham grades and Ayrshires. Buildings and fences medium. Not much attention paid to the yards and surroundings. Taken altogether, this farm is hardly up to the mark; and what also mars somewhat the general appearance is stony ridges running across some of the fields on the lower part of the farm; these ridges appear never to have been broken up, being almost worthless, and must be a great hindrance to cultivation. The back part of this farm, being heavier soil and somewhat damp, requires draining; this has been done in a measure with open ditches; these, as well as being rather unsightly, interfere with the cultivation of the fields, and it is certainly much better, wherever practicable, that the water should be carried off by means of covered drains. The high price of tiles in this county appears to militate against their general use. Having finished up our work in this part of Kent, we returned with Mr. White in the evening to his house at Charing Cross. Next morning we took train for Weldon, a station on the Canada Southern, and from there drove to Mr. McLean's.

MR. McLEAN'S FARM, HOWARD, EAST KENT.

This farm, owned by Mr. Duncan McLean, comprises 140 acres, 100 of which are cleared; it is about two miles and a quarter from Weldon, on the "Ridge Road," and

about the same distance from Ridgetown. The farm is divided by the road—the upper part on the rising ground is gravel; the lower part running down to the flats is clay. The crops grown are fall wheat, corn, oats, barley, and beans; wheat and corn after grass, and sometimes after barley. Corn and oats are all fed on the farm. From sixteen to twenty cattle are kept; five of these are thoroughbreds. Among the thoroughbreds is a very good Shorthorn bull, bred by J. S. Armstrong, of Eramosa. The Durham grade cows are a good lot, and show considerable attention in breeding. Working teams good, useful-looking animals. Good substantial stone house, neat, and well adapted for the requirements of the farm. Adjoining is an apple orchard of young trees and some healthy-looking peach trees. Other buildings medium, and rather out of order. Fences passable. No particular rotation is followed. Wheat hardly up to what we had seen on farms visited in the county. The farm generally rather out of order; considerable milk and rag weed on some parts. The land below the Ridge would well repay under-draining, and much might easily be done to add to the appearance of the whole.

Having got through with the inspection of Mr. McLean's farm, and this being the last farm to be visited in Kent, we next went to Ridgetown, and from there went by the afternoon express on the Canada Southern to St. Thomas, making close connection with the train for London on the London and Port Stanley road, reaching there in the evening, where we stayed overnight, preparatory to commencing our work in Middlesex next morning.

MR. RICHARD WHETTER'S FARM, WESTMINSTER, EAST MIDDLESEX.

Next morning we were met by Mr. Anderson, Secretary of the East Riding of Middlesex Agricultural Society, who accompanied us to the farm of Mr. Whetter. This property, comprising 115 acres, is very pleasantly situated, overlooking the city; and if the proprietor felt inclined to put it into the market for sale, would realize a large amount—part of the farm this year being assessed at \$370 an acre. This Mr. Whetter thinks rather a high rate of assessment for land used for farming purposes, grumbling accordingly, while we thought how fortunate he was in having land which was rising so rapidly in value. The soil of this farm is mostly a good clay loam, the fertility of which has been largely increased by heavy manuring. Mr. Whetter, who carries on the business of a stock dealer as well as a farmer, uses large quantities of purchased cattle food, chiefly meal and bran. The manure supply from this and the produce of the farm is supplemented by a good deal drawn from the city, the good results of which are seen in exceptionally heavy crops of clover, and a well-advanced and healthy-looking field of roots.

The crops this year comprise 13 acres of fall wheat, part Michigan Amber, the balance the old Soules, once so largely grown in this part of Canada, but now not often seen. Both varieties looked well, and would give a good average yield. Five acres of oats, and 5 acres of barley, 10 acres of clover, the latter very heavy; 16 acres of timothy, third year's seeding—this, like most of the fields of old grass that we had seen, was light; 4½ acres of mangolds and carrots, exceptionally good, well put in, and have been well attended to since, are very forward, and can hardly fail of a heavy yield if the season is at all favourable. Mr. Whetter places a high value on mangolds and carrots for stock feeding. Considers on his soil that they are more profitable to raise than turnips, although he wisely does not confine himself to the growth of one particular root crop. Mangolds he has found to be exceptionally good for late spring feeding, and especially for cows giving milk and for ewes after lambing. Mr. Whetter's experience in this respect coincides with that of most other farmers who have been in the habit of growing the different varieties of root crops, and from practical experience testing the comparative value of each. Probably one of the reasons why mangolds and carrots are not grown more extensively is, that to grow mangolds successfully it is necessary that they should be sown early, thus leaving very little time to prepare the land properly after spring seeding. This difficulty is, however, got over by Mr. Whetter, his plan being to thoroughly work the land in fall, leaving little to be done in the spring but prepare a fine seed bed and sow the seed; this allows him to get the sowing done early—a very important matter in connection with raising mangolds, for not only does the weight of the crop depend very much upon this,

but the hoeing and after-work can be got through with before the turnip crop requires attending to. This is no small consideration, as one of the chief difficulties we now have to contend with is, that so much of the season's work requires to be done during the month of July—not only has the bulk of the hay, fall wheat, and barley to be handled that month, but turnips have to be hoed, and if Canada thistles and other kindred pests have to be fought it must be mainly by thoroughly working the land during that and the two following months. In regard to the growing of carrots, the same may be said about fall preparation of the land and early sowing, the principal objection in many cases being the cost of thinning—for, where the assistance of women or boys cannot be readily procured, it is costly to have the work performed by able-bodied men. Besides the root crops already alluded to there is grown an acre of turnips, one of potatoes, and also four acres of corn; the crop, like what we had seen further west, was very backward. No particular rotation is followed; clover commonly ploughed under for fall wheat. The system of applying the manure on this farm is always to plough under.

Thirty head of cattle are usually wintered; about sixteen of these are stall-fed. At the time of our visit there was a very fine lot of twenty, mostly steers, in the pastures; these are intended to be sold off the grass, and most likely will find their way to the British markets, as they are just the class of cattle for that trade—fine heavy, well-bred, fleshy stock. The other cattle were a nice lot of eleven thoroughbreds, seven of these Shorthorns, and four Devons, all good animals. A flock of fair sheep was also in the pastures; these are intended for the butcher this season. The stock, taken altogether, whether breeding or fattening, is an extra good lot, and just the sort of animals from which money is made, Mr. Whetter evidently well understanding that part of farm management. The fences we found to be very good, with considerable portion straight board, well put up. The house and surroundings very fine, and forms a beautiful residence. Good taste has been displayed in making the most of the situation; beautiful lawns, with abundance of evergreens and other fine ornamental trees, help to fill out the picture. The outbuildings passably good, and suitable. This we consider a well and profitably-managed farm.

JAMES FISHER'S FARM, TOWNSHIP OF LONDON.

In the afternoon we drove to the farm of Mr. Fisher. This farm contains 100 acres, and is situated five miles from London, on the Sarnia gravel road. The first look at this farm was sufficient to enable us to see that it was going to mark very high. Everything about it indicated good judgment and good farming. System thorough and complete, and good order in every department; no indication of useless expenditure; everything good, but nothing extravagant. The soil is a clay loam, and is all either naturally dry or rendered so by thorough draining, and, as one of the results of the uniform dryness of the fields, we found the crops even and smooth, and all parts of the field alike forward. The acreage of the different crops this year are: Fall wheat, 11 acres, Clawson; barley, 7 acres; oats, 10 acres; 1 acre of peas; 13 acres of clover, of the first year; 6 acres of grass, third year's seeding; 20 acres of pasture. The orchard, garden, and grounds about the house comprise 5 acres; 7 acres of root crop, including 2 acres of mangolds, 4 of turnips, and 1 of potatoes. These crops were all uniformly good, clover and mangolds exceptionally so. The land clean and free from weeds. No rubbish or weeds about fence corners or at the back of buildings, places where weeds and dirt are too often seen even in otherwise well-cultivated farms. The rotation which Mr. Fisher follows as closely as circumstances will admit of, is: Clover ploughed under for wheat, and, when manure can be spared for it, it is ploughed under at the same time; oats after fall wheat and sod; roots follow oats, the oat stubble being heavily manured the fall previously, and the land well worked up the following spring; barley follows roots—in preparing for this crop the land is ploughed in the fall and worked the following spring, so as to have a fine seed bed. Land seeded down with barley.

A large stock is kept on this farm, considering the size, although it may be mentioned that besides the farm entered for competition Mr. Fisher has a pasture rented, thirty cattle being about the average number. The present herd includes thirteen pedi-

gree Shorthorns ; these are a pretty good lot ; some of the young stock, including a heifer calf one year old on the 12th of next October, and two young bulls, exceptionally so. Two young bulls were sold from this herd this spring for \$150 each. The balance of the cattle now on hand comprise twelve very good grades. Last winter twenty-two cattle were kept over, besides eight which were stall-fed, the average weight of which was nearly 1,500 pounds, and sold for \$740. Mr. Fisher goes largely into breeding sheep, keeping an average flock of from fifty to sixty ; at this time he has a flock of eighty-four—this includes lambs—this number will be considerably reduced by sales during the fall. These sheep are all pure-bred Lincolns, and, Mr. Fisher informed us, are all bred from imported stock. Those sold are all for breeding purposes, the lambs usually bringing from \$15 downwards, with occasionally an extra one ranging to \$25 and upwards ; last season shearlings were sold to go to Texas at \$50 each. There are now on hand seven shearling rams, some of which look like if they might take a good place in the show rings at the coming exhibitions. Five hundred and eight pounds of unwashed wool was sold as this year's clip, at twenty cents per pound. A few pigs are kept, and these, like the other stock, are good. While speaking of stock, it may not be amiss to mention that Mr. Fisher puts in practice his ideas of keeping what he believes to be the best and most profitable classes of all sorts of stock ; this is carried out even to the occupants of the poultry yards, for there is to be seen fifty or sixty pure bred Light Brahmas, and a very superior lot of ducks. Now, it may be said that these are small matters to attend to in a farm competition, but yet it must be borne in mind that the most successful farmers, as well as the most successful business men, are almost invariably those who bring shrewdness and good judgment to bear in the management of every department ; and if this holds good in speaking in general terms, it is peculiarly applicable when speaking of the business of the farmer, for the profits of the farm are not the result (only in very exceptional circumstances) of any one branch, but are usually made up from a variety of sources.

The management of the manure is similar to what is to be seen on many well-managed farms ; that is, to cart it out of the yards and put it into piles of a good depth, with square sides, so as to prevent as far as possible loss from leeching—often a fruitful source of loss where the manure is thrown in loose, scattered heaps, with a large surface exposed to the action of the weather. This question of drawing out manure and putting it into piles to ferment is an open one, for many first-class farmers believe that where there are no seeds of noxious weeds which require to be destroyed by fermentation, that it is better to apply it in a fresh state directly from the yard. Such being the difference of opinion in regard to this matter, we will not presume to say that there is only one right way of doing. Private road running from front to rear of the farm in good shape. Good fences, mostly board, neatly and well put up ; about fifty rods of barbed wire, with posts twelve feet apart and a board a foot wide at the bottom, with three-cornered scantling at the top. Good strong gates wherever required—these are well painted. The farm buildings form a square, are well painted, roofs tarred, doors all numbered for convenience, everything in good order, well suited for the different purposes for which they are required, with this exception, that a good deal of labour must be required in moving the stuff to the different stables, and in this respect we do not consider them nearly so convenient as the ordinary bank barns on those farms where much attention is paid to wintering stock. The buildings comprise : Horse stable, with harness room ; fat cattle and cow stables ; separate stable for bulls ; sheep houses, with yards attached, these again opening into a small pasture field, making it very convenient, as Mr. Fisher has generally some little lot which is being specially favoured ; carriage-house, with small room for harness, etc. ; waggon and implement sheds ; boiling and ash-house—this building is isolated from the other buildings, but not so far off as to be inconvenient—this is a matter of some importance on this farm, as Mr. Fisher boils and steams a great deal of food for his stock ; one barn, chiefly used for grain ; another in which a horse-power chaff-cutter is kept, is chiefly used for hay, oats, and peas. All the straw and hay is cut. Besides some other smaller buildings required for different purposes, there is one deserves special mention, that is, a tool-house and carpenter's shop ; in it is bench and vice, and all the ordinary tools which would be useful about a farm. A small stock of seasoned lumber, including scantlings of different sizes, such as are most frequently required for repairing the ordinary breakages, is always kept

on hand, as well as paints, nails, bolts, and the numberless little things that are so often wanted about a farm, and for the want of which so much time is often lost. Like Mr. Barker, of Paris (one of last year's competitors), Mr. Fisher keeps ready-made a stock of the smaller things, and those which are most frequently wanted, always on hand—no running to the woods to get a piece of timber to replace a broken waggon reach or a used-up doubletree, but straight to the tool-house, and there it is all ready. This is a branch of rural economy which heretofore has been too little attended to, and through neglecting it much greater loss is the result than many farmers are aware of. However, it is pleasing to see that at the Ontario School of Agriculture much attention is being paid in teaching the students the importance of that branch of farm industry. Mr. Fisher may be termed a handy man as well as a good farmer. All the buildings are painted, and this work he has done himself, as well as making gates, etc., and doing the general repairing about the farm. And often it is we see a farmer working slavishly hard during the whole year, when part of his time might be more profitably employed in putting in a stitch here and there and keeping things generally in good repair. However, it might be a little worse for the implement and machine agents. Considerable planting has been done; along the whole front of the farm is a nice row of sugar maples, as well as on both sides of the lane running from front to rear of the farm. The dwelling-house is built of white brick, large and very showy and well arranged, and possessing every convenience that is to be found in the best class of modern houses. The grounds are beautiful—cedar hedges, lawns, shrubbery, plants and flowers, all tend to make it a pleasant and cheerful residence. The working force on this farm is two men the year round. Two teams are kept—one a good stout pair, the other a little lighter, being used as drivers as well as doing the lighter work of the farm.

On our second visit we found a pretty fresh-looking field of rape growing where fall wheat was growing at the time of our previous visit. This will come in useful for fall feed, and it would appear to be a good plan when there is time to attend to the preparation of the land as soon as the wheat is off; if, however, this is delayed, there is not much use in sowing it. In other respects we found everything in pretty much the same good shape as at our previous visit. A windmill is being erected in connection with the pump-house, for the purpose of more conveniently supplying the yards and stables with water. We may also add that since our first visit Mr. Fisher has sold \$450 worth of sheep, at an average price of about \$20 a head, very forcibly showing the advantage of keeping the right class of stock.

Mr. Fisher's farm management we consider good in every respect, and specially well adapted to local circumstances: and although we award to him the first silver medal, we feel that it is one of those cases that has been hard to decide, and where, in point of merit, there is really very little difference between first and second place.

MR. HALIBURTON KENNEDY'S FARM, TOWNSHIP OF LONDON.

The next and last farm to be visited in East Middlesex was that of Mr. Haliburton Kennedy. This farm is situated in the Township of London, and contains 100 acres. There is nothing particularly noticeable about it, to take it out of the ordinary run of fairly managed farms. The farm is conducted as a grain and dairy farm; about sixteen cows are kept, the average receipts being about \$30 per cow, exclusive of Sunday's milk, which is used at home. This is rather low, and it would seem that the small returns are, in a measure, owing to the cows not being well enough fed—the pasture looking very bare for that sort of stock.

The grain crops we found to be pretty fair; 20 acres of barley, very good; 36 acres of fall wheat, a fair average, Mr. Kennedy estimating it at 25 bushels per acre. We were informed that last year 730 bushels in the cob was taken off 6 acres of corn. Usually summer fallows for fall wheat. Plenty of barn room; buildings passable.

MR. JAMES SMITH'S FARM, M'GILLIVRAY, NORTH MIDDLESEX.

From Mr. Kennedy's we were driven to Ilderton, a station on the London, Huron and Bruce Railroad, by Mr. Fisher, and from there took train to Clandeboye. Here we

were met by Mr. Smith and driven to Maple Lodge. This is a fine farm of 250 acres, situated about midway between Lucan and Ailsa Craig, in what is known as the Huron Tract, a rich and fertile belt running up to within a few miles of Goderich. The land is a rich clay loam with a free subsoil, and although level, yet, owing to the porous nature of the subsoil, very little loss or inconvenience arises from surface water: we were informed by Mr. Smith that within twenty-four hours after the heaviest rains the surface water has disappeared. Such being the free nature of the soil, comparatively little draining is necessary. However, wherever it was deemed an advantage to drain, Mr. Smith has done so.

The crops we found to be uniformly good, with the exception of mangolds; these were blanky, evidently caused by bad seed. This year's crops consist of: 30 acres of fall wheat, Clawson—this, with the exception of one small piece, was very fine; 10 acres of barley; 15 acres of oats—one field so heavy as to be very likely to lodge if the weather from now to harvest is at all soft; 7 acres of mangolds—as before said, irregular, but enough of good plants to make a pretty fair yield if the weather is at all favourable; 3 acres of turnips—well put in and healthy-looking; 30 acres of grass for hay—this was being cut at the time of our first visit, and was a very heavy crop, and will yield an immense amount of feed. At the opposite side of the road from the homestead is fifty acres, all in pasture, besides which, including bush run, there are about thirty-five acres more. Rotation and system of preparing for the different crops is as follows: Summer fallows for wheat; wheat also following barley and peas. As a rule Mr. Smith does not manure fallow for wheat: if manured the wheat would be liable to become rank and lodged. His plan is to manure for roots, then the following season the land is seeded down, and when broken up and summer fallowed after sod it is found to be in sufficiently good heart to bring a good crop. This, among other things, goes to show the great difference in the fertility of soils in different sections, for many of our best farmers in other parts of the country find that it is a very risky matter to try and grow a crop of fall wheat without an application of manure.

In the stock department Mr. Smith stands very high, being a noted breeder of Durhams as well as Leicester sheep. His herd, however, at the present time is not quite up to the average in numbers, on account of having made a sale last fall, at which a good many were disposed of. Those now on hand are grand animals—the cows, of which there are eleven, are a splendid lot, large, square, and fleshy, with good constitutions. The bull now in use, the Earl of Goodness, from Lady Goodness the 13th, by imported 30th Duke of Oxford, is a fine red three-year-old, very stylish, and well worthy of being at the head of such a herd. In founding and building up his herd Mr. Smith has made a good many purchases from Mr. Stone and the late Hon. David Christie, as well as largely from Bow Park, having at different times bought five bulls from that establishment. At this time there is on hand three very nice young bulls. The usual flock of breeding ewes is from twenty-five to thirty: these are Leicesters, with a slight cross of Lincoln—an extra good lot, plenty of size, well woolled, with no signs of weakness about them. In pigs not much is done, but, like all the rest of the stock, what is there is good. He has a well-bred Berkshire boar, which was bought at the Model Farm last year. In speaking of Mr. Smith's stock generally, it is not saying too much to say that men like him, who study the science of breeding, and carry into practical effect that knowledge, add largely to the wealth of any section in which they may be situated. Not only are the animals which are yearly sold making their mark wherever they go, but it affords an opportunity for all around them to judge by comparison of the advantages to be derived from breeding a superior class of animals, and the profits to be gained by liberal feeding, as compared with the system of semi-starvation, which is yet too much practised in many parts of the country. The truth of this is well known to those who are interested in the purchase of fat stock.

Fences fairly good. Farm buildings passable; a great deal too good to pull down, and yet for a farm where so much good stock is kept it may be set down as hardly up to the mark, as far as stabling is concerned. The dwelling-house is a very nice brick building, convenient and suitable. Surroundings fair. On the whole, we consider Mr. Smith a first-class farmer in most respects, and one who brings a great deal of intelligence and good judgment to the management of his farm.

On the 21st of September we made a second visit to this farm, and on this occasion we found no reason to change our opinion in regard to the general management. This, however, must be said, the stubble-fields were rather dirtier than we expected to find them. But, on the other hand, the turnip crop had passed through the dry weather without receiving that check which would have occurred if grown on a less fertile soil; and the mangolds had made an immense growth, good proof of what heavy manuring will do in the cultivation of this crop. Although on this farm there is not that freedom from weeds, the securing of which should be an important consideration on every well-managed farm, and while, in some respects, there is that want of trimness which militates against the general appearance, yet there is no doubt whatever that the system and management carried out on this farm is very good and highly profitable, and in our opinion is deserving of the bronze medal, as the Riding prize.

MR. JAMES McARTHUR'S FARM, EAST WILLIAMS.

Our next visit was to the farm of Mr. McArthur, about one mile south of Ailsa Craig, on the Nairn road. The back part of this farm forms the boundary on that side of the village limits. It comprises 140 acres. The soil is of a somewhat gravelly nature, and apparently not nearly so productive as the land in the neighbourhood of the last farm we visited. A good deal has been done in the way of draining, but evidently there are some spots on the farm that still require attending to in that way. The fences are either all good rail or board, the fences on both sides of the road, as well as some of the cross fences, being of the latter; these are well and substantially put up. The barns and out-buildings are a fair average. The house, which is a new one, is a fine large building, conveniently arranged, and finished throughout in excellent style, having every convenience that is considered necessary in a first-class modern house. The cellars, which form an important part of a farm-house, are exceptionally good. There are four, including root, fruit, and milk cellars, as well as one, in which is the furnace, which supplies the house with hot air; this cellar is used exclusively for furnace and fuel. The grounds about the house are now being put in shape, and by next year no doubt will add very much to the appearance of what is already a very beautiful residence. The crops we found to be a fair average, and had the appearance of being pretty well put in.

The ordinary breeding stock kept is about fifteen thoroughbred Shorthorns and a few grades. Besides these, there are generally about sixty steers bought in the fall and wintered over; these are run on the pasture the following summer and sold the same fall, keeping them on hand about twelve months. The winter management is to allow them to run outside and feed on straw and hay. We did not see all the steers that had been wintered on this farm, as most of the bought in cattle were pasturing on a large farm which Mr. McArthur owns some miles distant from the one he resides on, but we were shown a bunch of fifteen steers, which would probably average 1,500 pounds when sold off the grass this fall. These cattle weighed 100 pounds a head lighter when turned on to the grass than they did at the time they were bought the fall previously. At the time of our visit, in the end of June, they were quite fleshy; this we considered no indication that the plan of wintering was a good one, but rather as an evidence of the exceptionally nutritious quality of the grass in this famous grazing district. And although they were certainly a fine lot and showed no signs of bad wintering, and probably would make a capital return for money invested and food consumed, yet it is a question well worth considering, if the profit would not have been still greater if the same weight had been added to instead of being lost during the time they were off the grass. One thing, however, is certain, Mr. McArthur well understands what is the right class of cattle to buy, if those we saw are anything like the stamp of the others that he has on hand, for a finer lot of cattle than these will make for the English market it would be hard to find on any farm. Besides the breeding and feeding of cattle, a good deal is done in raising roadster and carriage horses, and apparently with a good deal of success, judging by some handsome ones Mr. McArthur now has on hand, as well as by the number of prize cards which has been awarded to him at the great fairs as well as at the local shows. And although your judges do not consider themselves as belonging to the class known as horse fanciers, yet

we very much enjoyed a drive behind a highly-bred pair of young chestnuts to the farm of the Messrs. Caverhill.

MESSRS. CAVERHILL'S FARM, TOWNSHIP OF LOBO.

This farm, consisting of 150 acres, is situated in the Township of Lobo, on the town line between Lobo and London, and about three and a half miles from Ilderton, a station on the London, Huron, and Bruce road. There are under cultivation 110 acres. The soil is a good clay loam, resting on a subsoil of clay mixed with limestone of rather a retentive nature. In the hands of some men this would have been a poor, sour farm, but by extensive draining and good management it may be set down—as far as the arrangement of the fields is concerned—in many respects as a model farm. In draining 50,000 tiles have been used, and so thoroughly has the work been done, that now there is not a single wet spot on the farm, with the exception of a pond, from which it is not desirable to draw the water. This work has entailed a great deal of labour, but the benefits derived are correspondingly great. Looking at it simply as an investment, the Messrs. Caverhill think the returns much greater than if the same amount of money had been loaned at seven or eight per cent., besides the satisfaction that there is in working a farm in this state, compared to what there would have been if left in the shape it was before these improvements were effected. The different crops this year were: Fall wheat, 26 acres of the Scott variety—this fall, Scott and Fultz are sown; barley, 12 acres; peas, 1 acre; oats, 15 acres of the Black Tartar; for hay, 24 acres; corn, 4 acres of the Blue Blaze (this sort is preferred on account of ripening one or two weeks earlier than the yellow); mangolds, 1 acre; pasture, 26 acres. The grain is all sown with the drill, and the following quantity of seed per acre is used:—Wheat, 2 bush.; oats, 2½ bush.; peas, 2½ bush.; barley, 2 bush. The following rotation is followed out as closely as circumstances will admit of:—Break up sod, and take one crop of oats and then one of peas, or two of oats, then manure heavily for roots; fourth year, barley; fifth year, fall wheat and seed down; mow two years, then pasture. The mode of preparing the land for fall wheat is to commence ploughing as soon as possible after the crops are off, using the cultivators and harrows freely until sowing time, and put on what manure can be spared from the root crop. For spring grain, plough in fall, and cultivate twice in the spring; always roll. For corn, manure in the fall. In preparing for mangolds a medium coat of manure is put on in the fall; in the spring the land is thoroughly worked up, then manured in the drill. Their reason for adopting this plan is that part of the manure being put on in the fall and worked in the land, the young plants get a good start before touching the manure in the drill.

It will be seen that on this farm, as on all the best-managed farms that we have inspected, and on those on which uniformly good crops are grown, the tillage is thorough and complete; a dozen different plans may be adopted as far as details go in working the land, but the end is pretty much the same—that is, a thorough preparation of the land for every crop; and the sooner our slipshod farmers realize the fact that nothing else will do, the sooner will their returns be equal to their more successful neighbours. Three men and five horses are required to do the work. A special feature on this farm, and one that would be followed with good results if practised by our farmers generally, is the management of the woodland, no cattle having been allowed in it for nine years; and as a result the growth of young timber is very fine. Perhaps there is nothing in connection with the farm so mismanaged by nearly all our farmers as the bush reserve. It is only a question of a very few years until it will be a rare thing to see a healthy piece of the old original bush standing in the older settled parts of Ontario, the cause for which is not far to seek. No doubt wind and fire have something to do with it, but undoubtedly the principal cause is in allowing cattle to roam at large through it, picking off every young shoot as fast as they appear through the ground, breaking and destroying the young saplings, and bruising the bark on the roots which are near the surface.

The fences are well put up, and in good order. The buildings only medium. The same may be said of the general surroundings. About 25 cattle and 35 sheep are usually kept. Six cattle are fattened and 15 sheep sold annually. The stock is the weak point

on this farm ; they certainly are not up to the standard of what might be expected from such first-class farmers in every other respect ; and this is a department of farm management which your Judges feel that a good deal of importance must be placed upon, especially in those districts where mixed husbandry is carried on, and where the supply of manure must be raised chiefly from stock kept on the farm. Under these circumstances we consider stock-raising and feeding one of the most important elements of successful farming. In other respects we consider these gentlemen first-rate farmers, and well able to give an intelligent reason for all they do.

In concluding our remarks on this farm, it may not be amiss, since they have gone so extensively into draining, and thereby have had an opportunity of judging of the advantages to be gained by it, to give in their own words what they consider to be the beneficial effects resulting from it. They say :—"It deepens the soil and gives the roots more feeding ground ; it helps to pulverize the soil, making it easier to work ; it prevents surface wash, and consequent waste of fertility ; it prevents to a great extent the winter-killing of wheat and clover ; it improves the quality and quantity of the crops, and tends to make the situation more healthy for man and beast."

This having wound up for the time being our work in Middlesex, we left for Woodstock, reaching there the same evening. The next morning we were taken in hand by H. Parker, Esq., President of the County of Oxford Agricultural Society. This gentleman is also a member of the Board of Agriculture and Arts for that division, so long represented by the late Hon. David Christie. We were also fortunate in having the company of Mr. Francis, proprietor of the *Woodstock Times*.

MR. DONALDSON'S FARM, EAST ZORRA, COUNTY OF OXFORD.

After leaving Woodstock, we drove five miles on the gravel road leading to Tavistock. Our first call was here made on Mr. Donaldson, of Huntingford. This gentleman is the owner of a very fine farm containing 300 acres. The general appearance of this property as seen from the road is very fine. Grand large homestead ; fine residence, with very much of an old country air about it ; beautiful and extensive groves and fine garden, and with that general appearance not easily described, but always noticeable about every well-managed farm ; and what adds not a little to the attractiveness of the situation is the general appearance of the surrounding properties. On the one side is that splendid property owned by Mr. Dunlop ; on the other is the well-known residence of Judge McQueen. A fine wood on the Judge's land, and flanking Mr. Donaldson's farm, forms a very attractive feature, and, situated as it is on ground rising to a considerable height, has no small share in adding to the beauty of the general surroundings. But as it was neither with the beauty of the landscape nor the general surroundings that we had specially to deal, but with farm management, it was necessary for us to do something more than stand in the grove and admire the scenery, although the latter would have been by far the most enjoyable, the day being one of the hottest of the season. The land we found to be a clay loam with a clay subsoil, all the arable land being either naturally dry or made so by draining. Besides the arable land, there are flats running along the sides of a creek on the side of the farm ; this is in permanent pasture, and affords a good run for the cattle.

Mr. Donaldson's system of farming is that of mixed husbandry, consisting of grain-growing, breeding of thoroughbred cattle and sheep, and somewhat extensively in that of fattening stock—the stock business generally as conducted on this farm being a specially noticeable feature. To commence with the crops and mode of management, we found there was grown this year 40 acres of fall wheat of the following varieties—Clawson, Scott, and Walker's Reliable ; with the exception of the latter, which was a very fine crop, and which we have since been informed yielded 33 bushels per acre, the crop was not up to the average of former years ; 13 acres of blue pea—this field had the appearance of being likely to give a very good return ; 15 acres of barley—fairly good at the time of our first visit ; at our second visit, seeing it after it was threshed, we found it to be a very nice sample ; oats good, yielded 60 bushels to the acre ; $2\frac{1}{2}$ acres of corn, as

well as 3 acres more for soiling—both lots very good, especially when the dry season is considered. This idea of growing corn for soiling purposes we consider might be followed with advantage by farmers generally; on most farms there is often a partial scarcity of cattle food during the fall months, and when this is the case, it answers a good purpose in supplementing the closely-nibbled pasture, and when not required for fall feed it answers well for winter feeding. Too much importance cannot be placed in keeping up a constant supply of food for cattle at all times of the year, for we can hardly fancy anything worse in farm management than to let stock lose in a few weeks, through mismanagement, what it has taken months to put on. This, however, is too often seen. The root crops consist of 12 acres of turnips, 2 acres of mangolds, and $3\frac{1}{2}$ acres of carrots, all extra good for the season. Mangolds Mr. Donaldson uses for spring feed, chiefly for cows after calving and for ewes; he finds them keep well, and answer a good purpose for inducing a flow of milk. Carrots are fed pretty freely to horses. Sufficient potatoes are grown for home use. Forty acres were cut for hay, and 60 acres pastured.

The rotation followed is peas after sod; fall wheat on pea land manured, and on clover ploughed under, as well as an occasional summer fallow, with what manure that can be spared from the root crop put on; fall wheat followed with oats; oat stubble heavily manured for turnips; then comes a crop of barley seeded down—manure in all cases ploughed under. The system of tillage we need not further describe than say that the plough and harrows are freely used, and judging from what Mr. Donaldson told us, and from what we could ourselves see, it is thorough and complete. The management of manure is good; it is drawn out and neatly piled. Considerable salt is used on the root crop; this, probably, had something to do with the fresh, healthy look of the turnip tops. Fences in good shape; mostly rail, but good of the sort.

The stock of cattle is 21 Shorthorns, besides the bull now in use—Seraph the 5th, a Bates bull, possessing many good points, as well as an animal of great substance. Besides the females, which are a good lot, there is on hand one yearling bull and four bull calves fit for service next year; not a cull among them—all good and thrifty-looking—just the sort of stock to send down to that part of Essex where we had been at work. Besides the thoroughbreds, 25 grades are usually kept; from 25 to 30 are fattened in the winter. Those fed last winter averaged 1,418 pounds on the 9th of May, and sold for \$5.95 per 100 lbs. The system of winter feeding on this farm is similar to that practised on all the farms that we have inspected where winter feeding and fattening of stock is much attended to, and where we have found it successfully carried out—that is, nearly all the fodder is passed through the chaff-cutter. For cattle that are wintering over, the proportions are about one-third clover and two-thirds straw; for the fattening cattle a larger percentage of hay is used. Although we have found this to be the invariable practice with the best feeders we have met with on those farms entered for competition, yet we are well aware that there are many successful stock-men who do not follow that plan. But there can be no doubt, where economy is studied, the former will be the plan adopted. In feeding fat cattle in the winter, the usual plan is to feed first thing in the morning two quarts of meal and cut stuff; after breakfast, cut turnips, with a little chaff; noon, cut turnips, chaff, and meal; the same at five o'clock; then at seven p.m. hay or straw. The daily allowance for each animal is about one bushel of turnips and from six to nine quarts of meal, varying according to the animal. The summer management of calves is to keep them in the house, and feed them freely with meal and a little oil-cake. Bull calves are always allowed to suck the cows.

A flock of from 55 to 60 sheep are kept; these, like the cattle, are good; one-third of these are Shropshire Downs, the balance Leicesters, with a dash of Lincoln. Taken altogether, they are an extra good lot, as the prices for which they are sold would indicate. They are mostly sold for breeding, shearling ewes of both sorts bringing from \$15 to \$20. Some of the Downs went to Missouri last year at \$16. A few are also got ready for the Christmas market. The plan of winter feeding is to give pea straw in the morning and evening, and clover hay at noon, with a few turnips, and the addition of a little grain in the spring. A few good Berkshires are kept for home use.

The homestead, including barns, stables, and all the buildings required on a large, first-class farm, is unquestionably one of the finest in the Province; extensive, substan-

tially built, conveniently arranged so as to save labour, and well finished in every respect. All the stables are paved with stones, as well as about ten feet wide in front of the buildings; the feeding-room floor with asphalt. The main barn is 95 feet by 74 feet, under which are stone stables and root-house. The stables under this building are solely for cattle, there being single stalls for sixty, besides box stalls. Mr. Donaldson prefers single stalls—finds the cattle rest better and keep cleaner. In connection with these stables is a feeding-room, into which the cut fodder, chaff, &c., passes directly from the floor above. A somewhat new idea is here seen in connection with the fattening stables—that is, water-tight troughs running immediately in front of the feeding troughs, and so arranged as to take up comparatively little room; into these water is pumped from the inside of the building. This is an idea which might, with great advantage and profit, be carried out on many farms, especially where a large number of cattle are kept; for not only is the work quite as easily—if not more easily—performed, but, what is of much greater importance in fattening stock, the perfect rest and quietness of the animal is insured. Besides these stables there is a bull stable separate. Running along the back of the cattle stables is a root-house, with storage room for 11,000 bushels; in it are screens so arranged as to clean the turnips from dirt as they pass down. One of Gardiner's horse-power turnip cutters is used; this is worked by horse power with a belt from above. All turnips are cut for the stock. Whether this is the best plan in all cases we will leave for other farmers to say. Separate from the cattle stables is a horse stable; this building is at least two or three feet higher in the inside than horse stables generally are, and all the better for it, we think. This is paved with stone, and is strongly and well finished; harness and grain rooms in connection. In the stable are ten stalls and box stall. Large sheep houses, four divisions, with separate yards; pig house, implement house, driving house, and horse-power under cover, makes up the set of farm buildings. In concluding our remarks about the buildings, we would say that it would well repay anyone who is purposing to put up a set of new buildings, if they have no fixed idea in regard to plan, to go a considerable way to see Mr. Donaldson's, even if it was not thought advisable to carry out the plan as a whole; yet there are many things and many new ideas put in practice there which could not be otherwise than valuable to any farmer who is going to build a new homestead.

The dwelling-house is something quite different to the ordinary run of farm-houses. This was built before Mr. Donaldson bought the farm. It is a cheerful-looking building; surrounded by a grove of three or four acres; the trees are chiefly beech and maple of about thirty years' growth, and are exceedingly healthy-looking. The garden, orchard, and all the surroundings are in excellent shape.

There are three pair of horses and a yoke of oxen required for the work of the farm; besides these there is a useful-looking driver and a pony kept. Six men are employed in the summer. Mr. Donaldson strongly favours the employment of married men on the farm. He says, and we think very truly, that farmers are a good deal to blame in not having a better supply of suitable labour. He looks at it in this way: When married farm men come from the old country, they naturally would like to get work that they have been accustomed to; but the great difficulty of finding a farm with anything like a decent cottage to live in, drives them against their will to towns and cities, there to pick up a precarious living the best way they can. There can be no doubt whatever that our system of employing farm labour is a bad one. If we had comfortable cottages for our farm hands, and if we tried to make their life a little more enjoyable, we would hear a good deal less about the scarcity of farm labour, and we would perhaps not hear quite so much about the exodus of men across the borders.

After having made a very full and careful inspection of this farm in all its various departments, we could come to no other conclusion than that it was in the hands of a man who well understood his business, and one who brings intelligence and good judgment to bear in all that belongs to its management. In some particulars, especially in his knowledge of and management of stock, Mr. Donaldson stands exceptionally high. It must also be borne in mind that there is certainly more difficulty in getting a large farm into a shape that will stand close inspection than there is a small one, although it is only just to Mr. Donaldson to say that we have, in awarding him the gold medal, made no

allowance for that whatever, but have awarded him the first prize, believing that, irrespective of size, it is, all things considered, the best-managed farm.

MR. THOMAS COWING'S FARM, BLANDFORD.

The next farm to be seen was that of Mr. Thomas Cowing, in the Township of Blandford. On our way there we spent half an hour at the Strathallen Cheese Factory. This is one of the largest factories in Ontario, using the milk from 1,100 cows. It is run upon the joint stock principle. The farmers who supply the milk are the Company, and they choose from amongst themselves a Committee, who, with a President, attend to the business. It has been found from experience that it is the most satisfactory way of conducting it. At this factory, the average make, at the time of our visit, was 45 cheeses a day. Up to the 15th of June, 1,452 cheeses had been sold, and 600 were then on hand. From \$45 to \$46, we were informed, would be about the average amount realized from good cows—\$50 exceptionally high for an average of a lot of cows. Of course, very much depends on the class of cows, and quite as much in providing them with a liberal supply of milk-producing food. The last sale of cheese made from this factory brought 9½ cents; the whey sold for the last three years at \$400 a year. On our way back to Woodstock in the evening, we called on Mr. Malcolm, who is probably one of the best authorities on the cheese question in the country; from him we obtained further information. He fully endorsed what we had previously been told about the advantages of the joint stock system of conducting factories, private companies requiring from 2 cts. per lb. and upwards for manufacturing, while large joint stock affairs, like the Strathallen, and East Zorra and Blandford Company (the latter being the one that Mr. Malcolm is connected with), being able to manufacture at about 1½ per cent. These figures cover all cost, except marketing. The cost, however, depends to a considerable extent on the number of cows within a given radius. The greater the number, the less the cost. Mr. Malcolm further informed us that, while the figures given above as the amount realized per cow is correct, yet there are many exceptional cases where the average on a lot of cows will reach from \$50 to \$60. His own, for instance, make that.

With this digression, we will go on with the farm of Mr. Thomas Cowing. This is situated near the village of Ratho, and contains 150 acres. The soil is a strong clay loam, lying on a subsoil of clay. Considerable draining has been done, and the farm altogether is in pretty good shape. It is extra well fenced, a large part being done with post and rail strongly and neatly put up. This year's crops consist of 16 acres of fall wheat—Clawson and Michigan Amber (this is a very good crop); barley, 20 acres; oats, 16 acres; peas, 3 acres; corn, turnips and potatoes, 8 acres (these crops were all good, and the general appearance denoted good land and good farming); woodland, 1½ acres—balance, pasture; hay, 28 acres—17 of this new grass. A stream runs through the centre of the farm, crossed by a private road, giving access to the cattle for water from the different fields. Fall wheat is grown on summer fallow and pea land manured; next crop barley seeded down, generally pasture one year and mow next; for summer fallow, land is pastured until June, then broke up with three horses; oats after grass and fall wheat; oat stubble manured for roots. From 35 to 40 cattle are kept, 15 of which are milk cows; these are a pretty fair lot and realize about \$45 per cow; a thoroughbred Short-horn bull is used; eight or ten cattle are usually fattened in the winter—last winter eight, which sold for \$400. Good fair farm buildings, with stone stables underneath for 45 cattle, and a stone root-house, which holds 2,400 bushels. The dwelling-house is a fine stone building, well finished and convenient; garden, orchard and surroundings passable. We would set Mr. Cowing down as a good energetic farmer, owning a first-rate farm, which is well and profitably managed.

Finishing up our work here, we left for Woodstock, reaching it about 9 p.m., having had a long day, and although pretty tired, we felt that we had spent one of the pleasantest since we had left home. The good company we had made our work enjoyable; and we would just take this opportunity of acknowledging the courtesey and kindness which we received at the hands of Mr. Parker, Mr. Francis of the *Woodstock Times*, Mr. Stephen White and other gentlemen, who, we are well aware, left their business and put them-

selves to considerable personal inconvenience for the purpose of making matters more pleasant and agreeable for us.

On Monday morning, after having enjoyed the kind hospitality of Mr. Parker, we left by Credit Valley Railway for Ayr, and from there drove to the

FARM OF MR. FERGUS ANDERSON,

which is two and a half miles west from the village. The Credit Valley Railway forms the back boundary, the township line running along the front. The farm consists of 152 acres. The soil varies somewhat, being partly clay and the balance clay loam. A small portion of the farm, from the appearance of the grasses, would lead one to suppose that it was somewhat sour, and that it would be none the worse to have a few more drains put through it. However, Mr. Anderson informs us that he has got the land on his farm, which was originally wet, into pretty good shape, having drained wherever he thought there would be an advantage in doing so. The draining having been done at first with rails and slabs, failed in the course of time, and the work has since been renewed with tile, the latter mode having been found in every way the most satisfactory. The crops on this farm were fair, although not by any means, as bulky as those previously seen on many of the other farms visited. Some of the land we found to be not in the best possible shape for inspection. This, however, was no fault of Mr. Anderson's, as he had let a large contract of stumping. A great many of these had been pulled last fall; the contractor had then given up the job, and the stumps were left lying just as they had been pulled, and it will require a good deal of labour to finish up work that should have been done by the contractor. The fences on this farm are fair; the buildings, which have been up 20 years, are pretty good and suited for the requirements of the farm. In the horse stables is to be seen quite a novelty in the way of a horse manger; it is an invention of his own and would seem to answer a good purpose. About 15 cattle and 20 ewes are usually wintered; five cattle and a few sheep are fattened; the sheep are a pretty good lot. A specialty with Mr. Anderson is growing fruit and the management of his orchard; there are 6 acres of orchard, 4 of this is apple and 2 acres pears; the trees look thrifty and have been well attended to; the apples are chiefly Northern Spy, Greenings, Baldwins and Snow apples; the pears are all Flemish Beauties. A good many grapes are also grown; Mr. Malcolm considers the Delaware the best table grape, and the Isabella, Clinton and Concord, good wine grapes. A large collection of different kinds of currants are also to be seen in the garden—fourteen different varieties in all. A splendid row of pines, planted along the road side on the front of the farm, forms a good wind break, protects the orchard, and looks very fine; these have been planted 24 years, and are now large trees.

Bidding good-bye to Mr. Anderson, we went back to Ayr, no way sorry that our work for the time being was ended. Here we met Mr. John Watson, the well-known Agricultural Implement Manufacturer, who, on finding that we had to wait two or three hours for the train, invited us to have a look through his extensive establishment. This we very willingly accepted, as hanging round a village, with nothing to do, is the next worst thing to having to wait at a road side station for an overdue train. Having got through with our visit to the mammoth establishment, we were driven by Mr. Watson to the station, and started for our respective homes.

The following is the list of entries:—

South Riding of Essex...	Thomas Parks.....	Township of Malden.
West Riding of Kent...	Alexander Dolson	“ Raleigh.
“ “	Jesse Mills	“ “
“ “	Samuel Sanderson	“ “
East Riding “	Duncan McLean.....	“ Howard.
“ “	James Smyth	“ Harwich.
“ Middlesex..	Haliburton Kennedy	“ London.
“ “ ..	James Fisher	“ “
“ “ ..	Richard Whetter	“ Westminster.
North Riding “ ..	A. T. & J. S. Caverhill	“ Lobo.

North Riding, Middlesex..	James McArthur.....	Township of East Williams.
“ “ ..	James Smith	“ McGillivray.
“ Oxford....	Wm. Donaldson	“ East Zorra.
“ “	Thomas Cowing	“ Blandford.
“ “	Fergus Anderson	“ Blenheim.

The following are the awards for this year :—

Gold Medal.....	William Donaldson.....	North Oxford.
1st Silver Medal.....	James Fisher	East Middlesex.
2nd Silver Medal.....	Alexander Dolson	East Kent.
Bronze Medal.....	James Smith	North Middlesex.
Bronze Medal.....	Thomas Parks.....	South Essex.
Bronze Medal.....	James Smyth	East Kent.

CONCLUDING REMARKS.

Before concluding our report, we would like to add that we have had this year, in more than one case, great difficulty in coming to a conclusion satisfactory to ourselves—notably so in North Middlesex. There we found two farms, each standing high in some respects, and weak in others, but each taken as a whole excellent. And it became with us a very nice point to balance and offset the weak and strong points, so as to do no injustice to either. The same remarks are applicable in regard to the farms of Messrs. Fisher and Donaldson. We would further say, that where there was any doubt at all in regard to placing them, we made a second and careful inspection, and we now feel perfectly satisfied that, although in some cases the competition was very close, yet that the decision we have arrived at is correct.

We would further say, that it will be noticed, in reporting on the various farms, that very little has been said about the implements, excepting where there was something to be seen out of the ordinary way. The reason for not taking any special notice of them in our report was, that we find on nearly all farms inspected that it was pretty much the same thing. On nearly all were to be seen all the improved implements that are necessary for carrying on the work of the farm.

We have also in reporting endeavoured, as far as possible, to lay before you whatever we thought would be valuable information in regard to the different systems and the different modes of management, and to bring before your notice whatever we thought would be valuable in the way of carrying on a business, the importance of which to this country cannot be overrated.

There is still one other matter we would like briefly to mention—that is, the noticeable and marked improvement which is going on in the way of rural embellishments, many of our farmers now giving evidence of marked good taste in designing and constructing their houses, seemingly holding the idea that it is of quite as much importance that they and their families should live in houses tasteful in design and convenient in arrangements, as it is for the dwellers in the cities. The weedy back yard and broken-down fences are now, in many cases, giving way to the neatly kept and well-stocked garden; the pigs and ducks, like the red man of the woods, having been pushed back to other reserves. In some sections it is the rule, rather than the exception, that neatly-kept lawns, ornamental shrubbery, and in not a few cases well-trimmed hedges and tastefully-arranged flower beds, are the surroundings of the farmer's dwelling. To the children growing up around us this must be an advantage, and will go far to solve the problem, “How to keep our young men at home.”

To make home life more enjoyable, and to give our children an opportunity of possessing cultivated minds and refined tastes, will surely never tend to make our sons and daughters worse farmers or farmers' wives.

JOHN J. HOBSON, } *Judges.*
CHARLES DRURY, }

This new departure taken by the Council of Agriculture and Arts has given great satisfaction throughout the country, and the medals granted are cherished highly by the

fortunate recipients. Group No. 3, for which prizes will be awarded in 1882, consists of the following Electoral Districts—Huron, three Ridings; Bruce, two Ridings; Grey, three Ridings; Dufferin, one Riding; Wellington, three Ridings; and Perth, two Ridings.

The next meeting of the Council was held in London on the first day of the Exhibition; and from day to day, during the continuation of the same, the Council met at the hours of 10 a.m. and 3 p.m., for transacting various duties, viz., reading protests, handing them to their various committees, and hearing reports on the same, recommending diplomas, and doing the thousand and one things necessary at such a time. The meetings were held in the new and commodious offices erected by the City of London during the past summer on their Fair Grounds. Too much praise cannot be awarded the city officials for the splendid accommodation provided for the Provincial Exhibition this year—visitors not recognizing the old grounds in their new dress; and fences, buildings, horse track are new, and everything was in first-class order.

Wednesday and Thursday of the first week were occupied in arranging the articles and live stock for exhibition, and Friday and Saturday by the Judges in making their awards, thus leaving the second week entirely free to the public, who came in crowds from all directions. The Exhibition terminated on Friday morning, and upon the whole must be considered one of the most successful of the Provincial Exhibitions, the weather having been propitious from the commencement. A few showers of rain fell to lay the dust, but nearly always at night. A comparative statement of the financial results will be submitted further on.

The evenings during the Exhibition were nearly all made use of by holding discussions on subjects of interest. The first discussion was held on Wednesday evening, the 21st of September—subject, "How to make stock-raising most profitable, and how best to advance the interests of breeders." The prize essays on Forestry were also read.

On Friday evening, the 23rd of September, the Thirty-sixth Annual Meeting of the Council and Directors of the Agricultural and Arts Association, for the purpose of selecting Auditors, deciding upon the place for holding the next Exhibition, and other business, was held in the City Hall—J. B. Aylesworth, Esq., *President*, in the chair. Henry Wade, the Secretary, then called the names of the Council and Delegates, the following gentlemen answering to their names, viz. :—

Members of Council.—District No. 2, Ira Morgan, Esq.; District No. 3, Joshua Legge, Jr., Esq.; District No. 4, J. B. Aylesworth, Esq., *President*; District No. 6, Geo. Graham, Esq., *Treasurer*; District No. 7, G. Moore, Esq., Waterloo; District No. 8, J. C. Rykert, M.P.; District No. 9, Henry Parker, Esq., Woodstock; District No. 10, J. Hunter, Esq., Eden Grove; District No. 11, L. E. Shipley, Esq., Greystead; District No. 12, Stephen White, Esq., Charing Cross; District No. 13, Charles Drury, Esq., Crown Hill.

D. P. McKinnon, Esq., South Finch, from District No. 1, and John Carnegie, Esq., from District No. 5, were unavoidably absent at this meeting, but were both in attendance on the second week.

Ex-officio Members.—Otto Klotz, Esq., Preston, Vice-President of the Mechanics' Institutes; E. Jackson, Esq., Newmarket, elected member of the Mechanics' Institutes; P. C. Dempsey, Esq., Albury, President of the Fruit Growers' Association; William Saunders, Esq., London, President of the Entomological Society; E. Casswell, Esq., Ingersoll, President of the Dairymen's Association of Western Ontario; Jas. Thompson Bell, Professor of Agriculture, Albert College, Belleville; James Mills, Principal Ontario School of Agriculture, Guelph.

James Young, M.P.P., Galt, was absent at this meeting, but attended several days during the Exhibition.

Ex-Presidents.—Sheriff Ferguson, Kingston; Sheriff Gibbons, Goderich; Thomas Stock, Esq., Waterdown; and F. W. Stone, Esq., Guelph.

Delegates from Agricultural Societies.—Addington, Wm. R. Aylesworth, E. R. Storey; South Bruce, William Clark, Richard Rivers; Cornwall, Benjamin Clark; Dufferin, Charles Scott; Dundas, George Van Allen, John H. Munro; West Elgin,

L. W. McIntyre; North Essex, Thomas Plant; South Essex, W. G. Baldwin; Frontenac, E. G. B. Pense, Mayor of Kingston, Wm. Breden; South Grey, Jas. Edge; East Grey, Thomas Kells; Halton, James Main, H. M. Switzer; Hamilton, E. D., John Eastwood, James M. Lotridge; East Hastings, Philander Ross, Jones Philips; East Huron, Robt. Gibson; West Huron, William Young, R. B. Scott; South Huron, William Wilson, James Pickard; Kingston, E. D., Thos. Briggs, Michael Flanigan; East Kent, J. Green; East Lambton, Robert Auld, L. Huffman; West Lambton, E. P. Watson, A. R. McGregor; North Lanark, G. Forgie; Lennox, John C. Cascadan, Benjamin Briscoe; South Leeds, Alvin Wilte, John M. Keeler; North Middlesex, A. A. McArthur; East Middlesex, Joseph Johnston, Leonard Odell; West Middlesex, John McPherson; Monck, John Jackson; Niagara, E. D., Robert Currie, Gage G. Miller; North Norfolk, O. P. Maybee, Oliver Jarvis; South Norfolk, Oliver Austin, Joseph McCaul; West Northumberland, John Isaac, W. J. Westington; Ottawa, E. D., John Crawford, Thos. Partridge; North Oxford, Joseph Peers, William Donaldson; South Oxford, Thomas Choate; Peel, Luther Cheyne, James Jackson; North Perth, George Hyde, James Ballentine; South Perth, J. Chalmers, W. F. Sanderson; West Peterborough, Joseph Walton, John Garbutt; Prince Edward, John P. Williams, Benjamin Storey; North Renfrew, James Finley; South Renfrew, William Miller; Russell, Duncan McDougall, Archibald Carson; South Simcoe, John Ross, Edward Jeff; Stormont, R. Vallance, William Kennedy; Toronto, E. D., George Leslie, Jr., W. H. Doel; North Waterloo, Henry Gross, John Keller; Welland, Anson Garner, George Hyatt; Centre Wellington, Hugh Roberts; North Wentworth, Joseph Boyle; South Wentworth, Joseph W. Jardine, Joseph Cline; North York, John Randall; West York, Ephraim Whitmore.

Delegates from Horticultural Societies.—Goderich, Peter Adamson; Stratford, D. R. McPherson; St. Marys, Duncan Miller; London, George D. Sutherland, John Plumber; Waterloo, Thomas Tilt; Elora, D. M. Potter.

Delegates from Mechanics' Institutes.—Paris, John Kay, Andrew H. Baird; Port Hope, Henry Wade, Fred. C. Wade; Garden Island, William Robinson, George C. Kirkpatrick; Kingston, William Dunn, R. J. Carson; Elora, David Boyle; Woodstock, William Grey, Robert Stark; St. Catharines, Dr. John H. Comport, George E. Paterson; Grimsby, John H. Grout; Milton, D. W. Campbell; Napanee, James Bowerman, F. Burrows; Stratford, Rev. C. Walker; Hamilton, George Roach, John A. Bruce; Toronto, Charles Parsons; Ailsa Craig, Duncan McArthur; London, Charles Chapman, A. Harvie; Preston, D. Hepburn; Galt, Thomas Cowan.

The PRESIDENT then read the following address:—

GENTLEMEN,—Having been honoured with the position of President of the Agricultural and Arts Association of Ontario, it becomes my duty to address you on the present occasion.

I think we can safely congratulate ourselves on the success of this, the 36th Provincial Exhibition—the eighth one held in this Western city. The first was in the year 1854. Some of those held here since that date have been among the most successful ones, financially, that the Association has ever had.

It affords us much pleasure to acknowledge the handsome manner in which the City of London has faithfully carried out the pledges given at the annual meeting a year ago by its chief magistrate, Mayor Campbell.

Last year the experiment was tried of holding the Exhibition for two full weeks, but this was found to be rather too long to be popular with exhibitors, so at the last annual meeting it was decided to commence on Wednesday and continue for nine days, taking part of two weeks; by this arrangement, it was thought, exhibitors and others could attend the Exhibition and return home,—being absent only one Sunday. If any better plan as to the length of time could be suggested at this meeting, I am sure the Council would cheerfully act upon it.

The judging in the different classes is all, or nearly all, completed. And we believe those ladies and gentlemen who have so kindly responded to the invitation to assist us as judges, have endeavoured to discharge their duties honestly and impartially. The Council has tried in all cases to appoint none but competent persons to act as judges.

It is a most difficult matter for a committee of judges to satisfy everybody, especially when there are a dozen or more competitors for the same premium. In a large number of cases it is not the money value of the premium that gratifies the recipient. Many prefer a medal or a diploma.

The object of awarding premiums at all Exhibitions—big and little—is not so much paying a certain number of dollars to a man because he is the owner of the best animal, or because he may chance to have the best wheat or other grain. Money premiums are given to meet, in part, the expense and trouble, and sometimes loss, in bringing animals and articles a long distance, and placing them on exhibition for the pleasure and profit of those who see them. And we are often very much benefited by what we see.

We think it hardly possible for an observing man to attend an Agricultural Exhibition without seeing and hearing much that must prove valuable to him.

Admitting the correctness of the axiom that "the earth is the source of all wealth, and that labour develops it," every reflecting mind must be impressed with the fact that the wealth and prosperity of a country depend largely upon the success of its agriculture.

To the inventive genius and enterprise of the mechanics of our Province must be attributed much of the success of agriculture in Ontario. They have supplied the various implements and the different combinations of machinery that have done so much to lighten the labour of the farmer, and to expedite the many agricultural operations he undertakes.

The display at the present Exhibition gives us the gratifying assurance that there is no immediate danger of a *falling off* in the supply of labour-saving machinery.

The Association has this year made a departure from its usual course by the initiation of prizes for the composition of essays on the subjects of "Forestry," and on the "Best Methods of Restoring the Fertility of Partially Worn-out Lands."

The successful essays are to be read at the meetings held during the evenings of the Exhibition, for the purpose of discussing these subjects and other questions of public interest.

Two years ago the Council of the Association decided to offer medals as prizes for the best kept and best managed farms. They grouped the county societies into six divisions or districts—the farms in one of each of these six divisions to be gone over and examined each year.

Last year District No. 1, comprising fourteen ridings, east of London, in the Niagara District, was taken. The judges made a full and lengthy report of the condition of the different farms they had examined. The report, after being submitted to the Council, was adopted, and a copy ordered to be sent to the Commissioner of Agriculture. This year group No. 2, composed of the Counties of Essex, Kent, Lambton, Elgin, Middlesex, and Oxford, has been taken, and a personal inspection of a number of the best farms in those counties made by the judges appointed for that duty. The result of the examination will shortly be given to the public in the form of a report. In like manner a district will be taken each year—a plan that will give to every farmer in Ontario an opportunity of having his farm examined for a prize, if he wishes to avail himself of it.

As a proof that our Government is still wise enough to understand what will, in this respect, promote the best interests of the Province, it has continued to aid the Association by a grant of some of the public money. We notice that *two or three* members of the Legislature seem to be opposed to giving the grant. They argue that aiding the Agricultural Association of the country is a *waste* of public money—that the benefit is not equal to the expenditure. If those gentlemen are honestly in search of something to reform—something that costs the country more than it is worth—they might, perhaps, find it nearer home in connection with their own indemnity.

As the years pass by, the condition of farming in Ontario is constantly undergoing changes. We can no longer depend on grain-growing alone. It is not necessary for us to enquire into the cause of these changes; it is enough for us to know the fact. Farming is now much more of a science than it was fifty years ago. The farmer who then could make a living easily would now starve if he followed the same system of cultivation.

We must turn our attention to stock-raising, dairying, fruit-growing, gardening, etc. We are pleased to notice the continued increase in the dairy interests; as also the fact that our products are taking a front rank in the English markets. What is most necessary now is, that those engaged in the manufacture of cheese and butter should be careful to adopt the best approved system of management, so as always to put on the market a first-class article, and preserve the good reputation Ontario has already acquired.

The raising of stock for exportation, though comparatively a new enterprise, has developed into a trade which is a means of profit to our farmers. Fifty thousand head of cattle were exported last year. And this year the exports to Britain alone will probably amount in value to three million dollars! To grow stock for the British market requires the exercise of excellent judgment. Poor cattle, sheep and horses, will not pay their expenses; while good animals in proper condition will pay a handsome profit to the shipper. Our native cattle would never pay for the trouble and expense of fattening and exporting. But the high-class grade, or the pure-bred animals, will sell readily at a profit. The same rule will also apply to sheep. Our farmers must learn to raise better-bred animals. If thoroughbred heifers cannot be procured, pure blood bulls, at any rate, can be, and this, in a very few years, will so improve the farm stock that it will be fully as profitable for exporting purposes as the pure-bred.

For the purpose of encouraging the further development of this, one of our greatest supporters, Mr. Weld, proprietor of the *Farmer's Advocate*, has generously given a prize of \$100 for the "best herd of fat cattle for shipping." This munificent prize is to be given annually.

The press is the cheapest and most effective educator of the masses, and it is gratifying to know that we have journals devoted especially to agriculture, ably edited, and true to the interests of the farmer.

Farming is, like any other profession, capable of indefinite advancement and improvement, and the farmer who thinks he "knows all that can be learned about farming" has very much need of instruction, and does great injustice to the profession.

Merchants try to keep thoroughly *well up* in all the departments of their trade. They take special interest in all periodicals which are calculated to keep them well posted in commercial matters.

The Doctor has his *Lancet*, and the Lawyer his *Journal*, the Merchant his *Monetary Times* and *Trade Review*, and so on all through the different professions and trades. But how is it with the farmer? Many of them take a newspaper for the general news—which is perfectly right, and what every one should do—but too many stop at that, thinking that, as they know all about farming, they don't need to take an agricultural paper!

Many farmers think that all the knowledge requisite in agricultural pursuits every farmer can learn for himself by experience, and make a living at the same time. And there are some who believe that the only way to get a correct knowledge of farming is to grow up on a farm and learn by experience and observation. No doubt the latter is the most certain method of getting a good common farm education, provided there be a competent instructor to lead the pupil.

But one thing lost sight of is, the practical farmer is much assisted and profited by the experience of others, and such experiences are to be met with in agricultural publications.

Farmers are just beginning to recognize the fact that science is a great help in agriculture. Chemistry applied to practical agriculture is capable of conferring the greatest benefits.

Entomology is a science, and there is no farmer, when his attention is properly called to it, but will concede the importance of knowing exactly what insects are harmful, and what are not. To know this means profit. We hope the day is not far distant when every farmer will read his agricultural paper, and believe that there is something to be learned in it, and also in books on subjects connected with farming.

Let the truth, that mind and muscle are co-workers in the great field of agriculture, be generally recognized, and a long step upwards will have been taken towards the attainment of the rightful position of the farming community.

On motion of William Saunders, Esq., seconded by J. C. Rykert, M.P., a vote of

thanks was unanimously awarded the President for his address, after which Mr. John Cavers of Galt, and Mr. J. J. Hobson of Mosborough, were elected Auditors for the ensuing year. Sheriff Ferguson then proposed, seconded by Mayor Pense, that the next Exhibition be held in Kingston, and offered the necessary guarantees. Mr. E. Jackson moved, seconded by ex-President Stock, that Toronto be the next place to hold the Exhibition, as by the four years' rotation it was its turn. After considerable discussion it was decided, by a majority of 38, that the next Exhibition be held in Toronto, notwithstanding that the Toronto Council had not given the guarantee that proper accommodation would be given; the delegates thinking they would give them the chance to either accept or refuse, as they think the Provincial is legally entitled to the grounds once in four years. An attack was also made on the Council for extravagance in the management of previous Exhibitions, not taking into consideration the expense connected with other works done by the Council, which was ably combated by J. C. Rykert, M.P., C. Drury, Esq., and other members of the Council; and on a division the meeting carried a resolution expressing themselves to have entire confidence in the Council, and congratulating them on reducing the expenses of the Association for the present year.

At the last meeting of the Council of the Agricultural and Arts Association in Toronto, the question of prescribing a course of study in Agriculture, and holding examinations annually at convenient centres for farmers' sons, was discussed, and Prof. Mills, President of the Ontario School of Agriculture, Guelph, was requested to draw up such a course of study to lay before the delegates from the Agricultural Societies of the Province, for their consideration and approval at the annual meeting. According to request, Prof. Mills submitted the following course:—

In the Third-Class Examination, the questions will be prepared with the view of ascertaining the candidate's knowledge of the first principles of agriculture—such as can be learned from a general course of reading on the subject, or from elementary lectures, without special study of the natural sciences.

In the Second-Class Examination, a broader and more exact knowledge of the subject will be required, and the questions will be of such a character as to test the general attainments of the candidate, and at the same time enable him to give proof of excellence in those branches of the subject to which he may have devoted special attention.

SYLLABUS.

THIRD CLASS.

The subjects of examination will be as follows:—

1. Different kinds of soils; their properties; variations in their compositions, texture, and condition; essential differences between good and poor soils. Substances found in plants, and sources whence they are obtained. Exhaustion of land; causes; how prevented; best modes of restoring exhausted lands. Necessity for manure; production and waste of farm-yard manure; use and manufacture of artificial manures; lime, salt, gypsum, bone dust, and mineral superphosphates as manures.

2. *Tillage Operations*.—Ploughing, harrowing, rolling, etc.; respective advantages and disadvantages of deep and shallow, fall and spring ploughing; subsoiling; fallowing; drainage, where necessary, and how done; effects of thorough tillage on lands; times and methods of sowing; after cultivation; harvesting.

3. The crops which each kind of soil is best adapted to produce; succession or rotation of crops; importance and necessity of rotation; rotations suitable to different soils and climates in Ontario; good courses of cropping; bad courses of cropping.

4. Live stock; best kinds of stock for various farms and localities; summer and winter management; economy of good management; general rules for guidance in breeding; conditions and circumstances favourable to cattle farming, sheep farming, dairy farming, and mixed husbandry.

Food; chemical elements and compounds found in the most important kinds of feed and fodder which can be successfully grown in Ontario; different materials necessary for growth, maintenance of heat, and laying on flesh; feeding and fattening of animals.

SECOND CLASS.

The subjects of examination will be as follows:—

1. *The Plant*.—Relations of the mineral, vegetable, and animal kingdoms to each other; nature and sources of plant food; composition of the most important crops grown in Ontario; period of highest nutritive value; chemical changes in the ripening of fruit, grain, and fodder crops; influence of climate on perfection of growth.

2. *The Soil*.—Physical and chemical properties of soils; classification of soils as determined by these properties; comparative fertility of different varieties of soil; active and dormant ingredients of soils; best means of converting dormant into active.

Chemical and physical conditions affecting the barrenness and fertility of soils; causes of unproductiveness; power of different soils to hold manures; influence of frost, aspect, elevation, and climate on the productiveness of soils.

3. *Manures*.—Production, management, and application of farm-yard manure; conditions which influence its quality; comparative values of cattle, sheep, and horse manures; green crop manuring; composts.

Properties and uses of artificial manures; lime, plaster, salt, bone dust, and mineral superphosphates as manures; circumstances under which each should and should not be used; times and modes of application; how to avoid the waste of such manures in the soil; their action on seeds and young plants; favourable and unfavourable action at different stages in the growth of crops; action of nitrates and ammoniacal manures on cereals, roots, and grasses; special action of salt when used alone, and also in connection with other manures.

Night soil and animal manures; combinations of manures for certain purposes; manures which impoverish the soil; quantities of manure to be used on various soils with different crops; general principles regulating the selection of manures.

4. *Tillage Operations*.—Deep and shallow ploughing, fall and spring ploughing, subsoiling, rolling, fallowing, etc.; advantages and disadvantages of each; preparation of land for different crops, as fall wheat, spring wheat, barley, oats, peas, and maize; differences in cultivation of light and heavy soils.

5. *Seed and Sowing*.—Quality of seed; importance of using clean and pure seed; effect of age on the character of crop; its rapidity of growth, and liability to disease; quantity of seeds per acre; methods and depth of sowing; change of seed, why necessary.

6. *Roots*.—Cultivation of roots and tubers—turnips, mangolds, carrots, beets, and potatoes.

7. *Green Fodders*.—Oats and peas, tares, lucerne, sainfoin, prickly confrey, clover, etc.; their comparative values; the management most appropriate for each; management of pastures.

8. *Rotation of Crops*.—Crops which each kind of soil is adapted to produce; succession or rotation of crops; importance and necessity of rotation; principles underlying it; rotations suitable to different soils, climates, and systems of farming in Ontario; their effects on the land.

9. *Drainage*.—Principles of drainage; effects on soil and subsoil; laying out and construction of drains.

10. *Exhaustion of Lands*.—Causes of exhaustion; how avoided; best means of restoring and enriching impoverished lands.

11. *Diseases of Crops*.—When plants are most liable to disease; causes of disease; chlorosis; fungoid diseases, as bunt, smut, rust, and mildew; remedies.

12. *Orchards*.—Planting, cultivation, pruning, grafting, etc.; best varieties of fruit trees for different soils and climates of Ontario; diseases and insect pests.

13. *Forestry*.—Planting and cultivation of forest trees, shade and ornamental trees, etc.

14. *Breeding of Animals*.—Principles for guidance in stock-breeding; reproductive powers—how strengthened or weakened; pedigree influence—how intensified or reduced; loss of size in pedigree stock; how to control good or bad qualities; maintenance of constitutional vigour; common causes of barrenness in male and in female; special aptitudes of certain breeds for different conditions of soil and climate; principles which regulate

special peculiarities, such as early maturity, rapid production of flesh, production of milk, growth of wool, etc.

Horses.—Most valuable breeds of horses for this Province; the leading characteristics of each; type of horse required for farm work; breeding, feeding and general management; common diseases and their treatment.

Cattle.—Characteristic points—merits and demerits of Shorthorns, Herefords, Polled Angus, Ayrshires, Jerseys, Devons, Galloways and Holsteins; in-and-in breeding; breeding in the line; results of each system; grade cattle; milch cows—points of a good milch cow; general management; economy of good management; conditions affecting quantity and quality of milk; common diseases and remedies.

Sheep.—Characteristics of different breeds; long-wooled, medium-wooled and short-wooled sheep; crosses between different breeds compared; influence of breed, climate, food, soil and shelter on the quantity and quality of wool—evenness, lustre, yield, fineness of fibre, felting power, etc.; feeding; winter and summer management; management of ewes before, during and after lambing season; rearing of lambs.

Swine.—Characteristics of the most important breeds of pigs; management of sows and stores; bacon curing, etc.

15. *Food and Feeding.*—Composition and properties of the most important varieties of feed and fodder available to the Ontario farmer; classification of foods; chemical results in the use of different foods; “heat-producing” and “flesh-forming” ingredients in food; best methods of combining these in feeding, so as to secure desired results; points to be observed in order to obtain the full value of natural and artificial foods; increase of value by preparation of food; shelter and warmth as means of economising food; chemical changes produced in malting of barley; its action and value as a feeding material; “good and bad systems of feeding.”

Entomology.—Common insects injurious to vegetation; their habits and the best means of checking and preventing their ravages.

Books of Reference.—“Handbook of Agriculture,” embracing soils, manures, rotations of crops, and live stock (Wrightson); “First Principles of Agriculture” (Lawson & Tanner); Report of the Ontario Agricultural Commission; “The Canadian Farmer’s Manual of Agriculture” (Whitcombe); “New American Farm Book” (Allen); “Farming for Profit” (Read); “Talks on Manures” (Harris). “Elements of Agricultural Chemistry and Geology” (Johnston and Cameron); “The Chemistry of Common Life” (Johnston by Church); “How Crops Feed” (Johnson); “How Crops Grow” (Johnson). “The Complete Grazier” (Youatt and Burn); “The Live Stock of the Farm” (Pringle); “Illustrated Stock Doctor and Live Stock Encyclopædia” (Manning); “Manual of Cattle Feeding” (Armsby); “The Shepherd’s Own Book” (Youatt, Skinner and Randall); “American Shepherd” (Morrell); “The Horse in the Stable and the Field” (Stonehenge); “The Farmer’s Veterinary Adviser” (Law); “Harris on the Pig.” Annual Reports of the Entomological Society of Ontario; “Harris’ Insects Injurious to Vegetation.”

In regard to the books of reference, Mr. Mills said that the list given above contained only a few out of a large number that might be named. The first on that list, that is, the “Handbook of Agriculture,” by Prof. Wrightson, of the College of Agriculture, England, was not expensive, and would be found to cover nearly all the points referred to in the Syllabus.

In his remarks accompanying the reading of the paper, Professor Mills explained that the object of this course of study is two-fold—first, to create and foster, as far as possible, a taste for reading among the rising generation of farmers, and induce them to spend a portion of their time during the winter evenings in acquiring such information, in regard to their own occupation, as will enable them to adopt more enlightened, and hence more profitable, methods of farming than prevail in many sections of the Province at the present time; secondly, to direct the study of young men who may wish to prepare themselves for teaching the elementary principles of agriculture in our public schools, in case the Minister of Education should decide to place that subject on the public school programme, as requested by the resolution of the members of the Dominion Grange at their late meeting in Toronto.

In conclusion, Prof. Mills recommended:—

1st. That an examination on the subjects of this Syllabus as it now is, or as it may be modified, be held annually on the second Wednesday in April, at such centres as a committee appointed for the purpose shall decide upon.

2nd. That the examiners appointed from time to time lay their questions before a committee on examinations, to be named by the Council.

3rd. That the questions as approved by the said committee be printed, and at the proper time sent under seal to the gentlemen appointed to take charge of the examinations in the different agricultural districts in which there may be a sufficient number of candidates to warrant the Council in holding an examination.

4th. That the Public School Inspectors of the localities in which the examinations may be held, take charge of the examinations for the same pay and on the same conditions as they now take charge of the Intermediate and Second Class examinations.

5th. That the Committee on Examinations, through the Secretary of the Association, publish the results of the examinations as soon as convenient after the examiners make their report.

6th. That the names of the successful candidates be read by the Secretary, and the certificates formally granted by the President at the annual meeting of this Association.

Mr. Drury moved, that in the opinion of the delegates assembled at the meeting, it is desirable that the Council of the Agricultural and Arts Association should prescribe a course of study in Agriculture, and hold examinations annually for farmers' sons and others at convenient centres, and grant certificates under such restrictions and according to such regulations as may be best suited to accomplish the object in view, and that the course of study laid before us meets with our approval. That four scholarships be offered, a first and second for successful candidates who shall stand at the head of each class, provided the first shall receive not less than 75 per cent., and the second not less than 67 per cent. of the total number of marks.

This was carried unanimously, and the meeting adjourned.

On Monday evening, the 26th, a meeting was held to hear the essays read on "The Best Methods of Restoring the Fertility of Partially Worn-out Lands," and to discuss the subject.

On Wednesday evening, the 28th, a public meeting, advertised in the prize list, was held, consisting of breeders of all kinds of thoroughbred animals, with the view of gaining their opinions, and discussing the subject of Herd Books generally. This meeting was well attended by Shorthorn breeders notably, also a delegation from the Shorthorn Breeders' Association, who all advocated the necessity of raising the standard for entry into the Herd Book to be, that animals in all cases should be traced to importations from England. And on motion this was carried almost unanimously. A want of confidence motion was also put to the meeting, with the object of taking the Herd Book out of the hands of the Council, but was defeated.

The result of this meeting of breeders was that the Council, at their next meeting, passed the following resolution: "That, in view of the resolution passed almost unanimously at the meeting of breeders of cattle held last evening, after ample notice to all concerned, this Council forthwith raise the standard for admission to registration in the Canada Shorthorn Herd Book, so that no animal shall be entered unless the pedigree traces in all crosses direct to imported stock." At this meeting it was also resolved, "That, inasmuch as the time allowed for the preparation of the essays on 'Forestry' and 'The Best Methods of Restoring the Fertility of Worn-out Lands' this year was insufficient to enable the writers to do either themselves or the subjects justice, it is desirable that similar prizes for essays, bearing on the same subjects, be awarded next year; and that Professors Mills, Bell and Buckland be a committee to submit at the next meeting of the Council the special subjects to which essays shall relate, with any conditions which the experience of this year may indicate as desirable to attach thereto."

At the meeting of the Council, held on Thursday evening, in the Entomological rooms, a resolution was passed, granting the City of London the sum of \$1,000, in consideration of the great expense they had been at in getting the grounds ready for the Provincial this year, and that the Council regret their inability to increase the sum.

The following statement of the amount of competition in each general class, as taken from the entries, may prove interesting as comparing the last four years :—

Horses.—In all classes there were 749, for which was paid in prizes \$1,653; against 740 in Hamilton in 1880; 492 in Ottawa in 1879; and 816 in Toronto in 1878; and 1,075 in London in 1877. There were several imported horses shown this year, both Clydesdales, Suffolks and Percherons. The exhibition of horses was very fine indeed.

Cattle.—In all the classes there were 656; paid in prizes to the several classes, \$2,793; against 424 at Hamilton in 1880, 618 in Ottawa in 1879, 640 in Toronto in 1878, and 591 at London in 1877, showing on the whole a marked increase over any other year. The quality also was excellent in all classes. A class was made this year for Angus or Polled Aberdeen cattle, and there were 6 entries. The fat cattle were very fine, and there was quite a spirited competition for Mr. Weld's special prize.

Sheep.—Of all kinds there were 705 entries, for which the prizes awarded amounted to \$1,381, against 675 in Hamilton in 1880, 431 in Ottawa in 1879, 659 in Toronto in 1878, and 859 in London in 1877. The show of sheep was exceedingly fine this year in all classes. Several of the Downs were imported. Merinoes were also shown for the first time for a great many years.

Swine.—In all classes of pigs there were 386 entries, for which were awarded \$1,007; against 407 at Hamilton in 1880, 355 at Ottawa in 1879, 471 at Toronto in 1878, and 532 in 1877—a small falling off in numbers from previous years, but the quality was very superior, the Berkshire still taking the lead, followed closely by the Suffolks.

Poultry.—Entries were 632, for which was paid in prizes \$321; against 821 at Hamilton in 1880, 460 in 1879, 821 in 1878, and 847 in 1877. An excellent show in this department.

Farming Implements.—In agricultural implements, machines, tools, and carriages, there were 615 entries, for which was paid in premiums \$665; against 370 in Hamilton in 1880, 470 in Ottawa in 1879, 588 in 1878, and 633 in 1877—showing a large increase in numbers over former years. The display was also very fine.

Agricultural Products, consisting of grains, seeds, field roots, dairy produce, sugar, bacon, and domestic and other wines. There were 1,078 entries, for which was paid \$1,510 in prizes; against 1,310 entries in 1880, 1,492 in 1879, 917 in 1878, and 1,393 in 1877. The show of grain and seeds was good. The dairy products, on account of the very dry season, was not quite up to the mark in either quantity or quality; still the display was good, and the success of this part of the Exhibition was materially added to by the co-operation of the Western Dairymen's Association, and their contribution of \$250 towards the prize list. The display of honey, both in the comb and strained, was very good. Sugar and bacon was fairly represented. The display of native and domestic wines were highly commended by connoisseurs.

Horticultural Products, consisting of fruits, flowers, and garden vegetables, 2,631 entries, for which \$1,330 was paid in premiums; against 3,999 entries in Hamilton in 1880, 2,252 in 1879, 3,233 in 1878, and 2,123 in 1877, showing a large falling off from last year; but when the very dry season is taken into consideration, it is not to be wondered at. The samples of fruit were very fine.

Arts and Manufactures.—The articles exhibited were arranged under the following classifications :—The *Fine Arts*, in oil paintings, water colours, crayons and pencil drawings, statuary, photography, architectural drawings, etc.; then comes Natural History and Mineralogy; the ladies' work, useful and ornamental; chemical preparations; printing and bookbinding and paper. The *Manufactures*, such as musical instruments, building materials, cabinet ware, machinery, tools, sewing machines, metal work, stoves and castings, saddlery, harness, trunks, shoe and boot-makers' work, wearing apparel, furs, woollen goods, and groceries and provisions; there were 1,923 entries, on which premiums to the extent of \$2,381.50 were paid; against 2,571 in 1880, 2,402 in 1879, 3,110 in 1878, and 2,567 in 1877—showing a marked falling off in this department, especially in the classes of machinery and tools, chemical preparations, ladies' work, printing and bookbinding, building materials, metal work, shoe and boot-makers' work, wearing apparel, groceries and provisions, showing conclusively that these branches of the Arts' Department either do not require to exhibit every year, or that the exhibi-

tion fever is dying away, notwithstanding the increased expense of erecting magnificent buildings and motive power for the machinery at nearly every Fair-ground. On the other hand, the strictly agricultural part of the Exhibition still keeps up its interest, notwithstanding the number of shows in existence. There is also this year a new departure by our Council from the old track in awarding prizes to Essays on different subjects, which has been found to take well and give satisfaction, as well as they hope it will impart useful information to the public, as the Prize Essays will be all published in this Report, which your Department so generously circulate.

For further particulars in reference to the competition in each class, as compared with the four previous Exhibitions, I beg leave to refer to the subjoined table, showing the amounts offered in prizes, the amounts awarded, and the number of entries in each class for the last four years.

Financial Results.—The total amount received for members' fees, rent of refreshment booths, stables, licenses, forage sold, prize grants, and admission fees, was \$20,029.26; against \$13,960 in 1880, \$11,656 in 1879, \$23,458 in 1878, and \$21,734 in 1877.

I have the honour to be, Sir,

Your obedient servant,

HENRY WADE, *Secretary.*

RESULTS of the Exhibition of 1881, showing the Amount offered in Prizes, the Amount Awarded, and the Number of Entries in 1881, 1880, 1879, 1878, and 1877.

CLASSES.	Amount offered, 1881. \$ c.	Amount awarded, 1881. \$ c.	Number of Entries, 1881. London.	Number of Entries, 1880. Hamilton.	Number of Entries, 1879. Ottawa.	Number of Entries, 1878. Toronto.	Number of Entries, 1877. London.
Thoroughbred Horses	277 00	232 00	46	50	39	51	63
Roadster Horses	390 00	359 00	200	196	123	194	329
Carriage Horses	458 00	426 00	245	221	149	241	373
Agricultural Horses	351 00	271 00	149	148	122	215	203
Heavy Draught Horses	371 00	320 00	109	90	59	115	107
Durham Cattle	644 00	624 00	174	134	102	283	205
Hereford Cattle	355 00	355 00	62	46	33	27	41
Devon Cattle	355 00	335 00	73	42	51	45	65
Ayrshire Cattle	543 00	503 00	104	103	194	129	137
Galloway Cattle	355 00	215 00	34	37	54	47	47
Jersey, or Alderney Cattle	117 00	84 00	51	23	61	27	14
Angus, or Polled Aberdeen Cattle	50 00	50 00	6				
Grade Cattle	250 00	250 00	90	29	62	63	64
Fat and Working Cattle	390 00	377 00	62	46	61	66	65
Cotswold Sheep	268 00	268 00	153	155	55	244	141
Leicester Sheep	266 00	266 00	184	204	137	184	294
Lincoln Sheep	234 00	234 00	143	94	54	85	201
Southdown Sheep	294 00	295 00	107	136	105	107	112
Shropshire and Hampshire Down Sheep	168 00	168 00	55	60	44	15	38
Merino Sheep		63 00	26				39
Fat Sheep	87 00	87 00	36	26	36	24	34
Improved Berkshire Pigs	230 00	225 00	126	131	123	214	276
Suffolk Pigs	228 00	228 00	105	141	90	147	152
Poland China Pigs	190 00	170 00	57				
Essex Pigs	190 00	180 00	50	76	35	42	31
Yorkshire and other Large Breed Pigs	228 00	204 00	48	59	107	68	73
Poultry	205 00	198 00	319	417	284	396	402
Chickens and Ducks of 1881	138 00	123 00	313	404	176	425	443
Agricultural Implements and Machines (for Exhibition only)			160	141	121	185	149
Carriages, Sleighs, and parts thereof	391 00	270 00	195	152	253	266	332
Agricultural Tools, etc. (hand use)	296 00	231 00	160	150	113	158	217
Field Grains, Hops, etc.	331 00	164 00	100	77	116	137	152
Small Field Seeds, Flax, etc.	489 00	475 00	319	381	506	319	456
Field Roots, Hoed Crops, etc.	194 00	117 00	85	113	185	80	81
	229 00	205 00	416	452	400	314	644

Dairy Produce	650 00	645 00	172	257	276	86	112
Honey, Sugar, Bacon, etc	77 00	37 00	44	45	78	67	61
Domestic Wines	92 00	31 00	42	62	47	50	39
Fruit (Professional List)	207 00	164 00	61	80	76	101	111
Fruit (General List), Apples and Pears	383 00	363 00	1283	1985	843	1792	617
Fruit (General List), Plums, Peaches, etc	443 00	347 00	432	943	550	604	474
Garden Vegetables	183 00	177 00	543	611	475	433	643
Plants and Flowers	376 00	279 00	312	380	308	293	278
Fine Arts (Oil Paintings)	308 00	300 00	185	191	162	181	166
Fine Arts (Water Colours, Crayon, etc)	332 00	261 00	288	361	319	354	284
Fine Arts (Penmanship, Photography, etc.)	252 00	178 00	69	75	119	141	101
Natural History and Mineralogy	274 00	158 00	45	54	86	29	33
Ladies' Work (Ornamental)	220 00	191 00	311	413	628	372	289
Ladies' Work (Useful)	139 50	125 50	261	216	416	369	324
Chemical Preparations, etc	162 00	55 00	36	39	78	87	43
Printing, bookbinding, Paper, etc.	112 00	32 00	36	33	68	372	47
Musical Instruments (Exhibition only) .....	.....	.....	45	19	6	48	15
Building Materials, etc.	214 00	61 00	33	50	61	88	58
Cabinet Ware, etc	323 00	202 00	84	86	100	168	126
Machinery, Tools, etc	1017 00	254 00	97	135	191	422	213
Sewing Machines (Exhibition only) .....	.....	.....	31	48	24	45	60
Metal Work (Miscellaneous)	298 00	64 00	66	73	92	268	237
Stoves and Castings	166 00	86 00	89	159	152	.....	.....
Saddlery, Harness, Trunks, etc.	200 00	71 00	26	50	54	45	54
Shoe and Bootmakers' Work, etc.	179 00	76 00	32	41	72	59	102
Wearing Apparel, Furs	245 00	67 00	36	71	76	46	44
Woollen Goods	315 00	125 00	103	139	190	63	76
Groceries and Provisions	195 00	75 00	66	72	128	100	78
Essays on Forestry	100 00	100 00	11	.....	.....	.....	.....
Medals, etc	100 00	360 00	.....	.....	.....	.....	.....
Totals	17154 50	13456 50	9486	11252	9668	11292	10618

COMPARATIVE TABLE, showing the progress of the Provincial Exhibition since its commencement in 1846.

Year.	PLACE OF EXHIBITION.	Total amount offered in Prizes.	Total number of Entries.	Total amount awarded.
		\$ c.		\$ c.
1846	Toronto	1600 00	1150	1100 00
1847	Hamilton	3000 00	1600	2400 00
1848	Cobourg	3100 00	1500	2300 00
1849	Kingston	5600 00	1429	2800 00
1850	Niagara	6106 00	1638	3400 00
1851	Brockville	5017 85	1466	3223 75
1852	Toronto	5916 95	3048	4913 00
1853	Hamilton	6410 15	2820	5293 25
1854	London	7176 10	2933	5427 50
1855	Cobourg	9216 30	3077	6941 70
1856	Kingston	9238 00	3791	6799 50
1857	Brantford	10071 40	4337	8136 00
1858	Toronto	10700 50	5572	9215 00
1859	Kingston	10513 00	4830	8067 50
1860	Hamilton	15015 50	7532	12900 00
1861	London	12031 00	6242	10188 00
1862	Toronto	12236 00	6319	10722 00
1863	Kingston	11866 00	4756	9166 00
1864	Hamilton	12559 50	6392	10304 25
1865	London	13434 00	7221	11036 75
1866	Toronto	12712 00	6279	10288 50
1867	Kingston	12731 00	4825	9311 50
1868	Hamilton	13304 50	6620	11120 00
1869	London	13428 00	7649	11459 50
1870	Toronto	14110 00	6847	12441 70
1871	Kingston	15724 50	6682	12951 00
1872	Hamilton	16092 00	7714	13142 00
1873	London	16016 00	8420	13797 00
1874	Toronto	16640 00	8162	14070 00
1875	Ottawa	16996 50	7318	14651 00
1876	Hamilton	18237 00	10011	15631 50
1877	London	16320 60	10618	14387 00
1878	Toronto	17947 40	10292	13980 00
1879	Ottawa	18525 00	9668	14957 50
1880	Hamilton	16994 00	11252	13147 50
1881	London	17154 50	9486	13456 50

ESSAY ON HOW TO RESTORE FERTILITY TO PARTIALLY WORN-OUT LANDS.

BY WILLIAM L. BROWN, HYDE PARK.

To which was awarded the First Prize by the Agricultural and Arts Association.

To answer this question properly and satisfactorily would require such an exhaustive essay, that I do not think the subject could be treated in one chapter. On this question alone—fertility—depends the whole science of Agriculture; and this again is an industry which has for its chief aim profitably to avail itself of the powerful forces which nature places at our disposal for the increase of vegetable and animal life; and this increase is based upon the employment of certain agents which are essential to these forms of life. It will not be amiss, then, to state briefly what these agents are, and to this end it is necessary to analyze the products of our soils, and the simplest way to do this is to burn them, and we find they are resolved into their constituent elements—one portion of the plant goes off in the shape of gases, and a remainder is left in the shape of ashes. It will then be seen that our plant has been composed of two parts or elements, which are respectively called the *organic* and *inorganic* parts of the plant. That which burned away was the organic part, and that which remained—the ash—the inorganic part. Chemistry teaches us that these parts, the organic and inorganic, are composed of certain elements, 14 in number, and that these same elements exist in all animal and vegetable life. The organized part of the plant consists of four—oxygen, nitrogen, carbon and hydrogen; the inorganic part of potash, soda, lime, magnesia, oxides of iron and manganese, chlorine, phosphoric acid, sulphuric acid and silica.

Now, this is the starting point. Experiment shows that plant life, for its development, must always find and set in motion these elements, but that it combines them in an infinity of proportions and in a variety of structures. The source from which the plant receives its nutriment is then of the greatest importance in this question of fertility. The composition of a plant, as I said before, is found to be gaseous and solid; the gaseous or organic part is found to be nine times the weight of the inorganic part, or the ash. Now, the organic part, gaseous, is composed of carbon, oxygen, hydrogen and nitrogen,* all of which, if we except the latter, are received by the plant from the atmosphere, and the remaining one-tenth or organic part of its support is received from the soil; so that in reality all the fertility that can be restored to the soil by the hand of man is but insignificant compared with what is supplied from the great store-house of nature—the atmosphere; yet, insignificant as this inorganic element is, it is absolutely necessary to the life and growth of a plant—so much so, that if any of it be absent (any of the ten elements, potash, lime, phosphoric, etc.) the plant cannot be produced to perfection. Now, the absence of any of these, or any undue proportion of one or the other, would make a barren soil, and hence a soil may be rich in one element and poor in another, and consequently a soil may be only partially poor, as the subject of the essay calls for "*How to Restore Fertility to Partially Worn-out Soils.*"

To come, then, at this important question of fertility tersely, we have it narrowed down to land which at one time was fertile, but by continuous cropping has been *worn*; or, in other words, that some of the ten elements of inorganic life, potash, etc., have been taken away and the equilibrium of plant growth destroyed. Land is often infertile, worn out, by having one or more of these elements exhausted, especially potash and phosphoric acid and lime. It will be found that our worn-out lands in Ontario are so by continual cropping with some particular class of plants, such as wheat, oats and barley, and that these lands are only poor in the elements which these take more largely from the soil than any other, and that is phosphoric acid and potash. I by no means say that this is all that is wanting, but these are the principal elements, and plant food that will supply these is what is wanted more than any other elements. It will always be found

* Leguminous plants, such as clover, peas, beans, etc., derive from the atmosphere the greater part of the nitrogen that enters their composition, whilst the graminaceous plants, such as wheat, oats and barley, assimilate a certain quantity of nitrogen by their roots, and also take it from the air.

that the relative productiveness of different soils is intimately connected either with an abundance or a deficiency of phosphoric acid and potash. A deficiency of the alkalies, especially potash, is a frequent cause of the unproductiveness of soils. Root crops, especially have ashes rich in potash, and the failure of roots on land which formerly produced good crops, I can safely say, is owing to the exhaustion of their available alkalies. But I may say here that unproductive soils are rarely deficient in one element alone, and consequently they *cannot be made fertile by supplying one material*, such as all potash, and all phosphoric acid, or all lime, for soils are infertile when they are deficient in one or more of the elements found in the ashes of plants, but supplying one element does not necessarily make the soil grow good crops. A poor, hungry soil is in reality deficient in phosphoric acid, potash and lime. I think in a great number of cases an analysis of the soil would be of great service. It is an easy matter to restore fertility if we know what elements of plant growth are absent and lacking in availability; and if several are wanting, what manure contains these elements in the cheapest and most available form. I do not know whether our farmers would or could conveniently analyze their soil, but certainly it would pay. I have known an endless amount of money spent on salt, lime, and other manures without any benefit, simply because the soil did not require these ingredients.

The general cause of the sterility of soils is either the absence of certain constituents indispensable for the growth of plants, or the presence of others which exert an injurious or poisonous action; and hence an analysis is often necessary in order to find out what injurious element preponderates, and what to apply in order to neutralize it. On the supposition, then, that we know exactly what food our soil is lacking in, how shall we best restore it? And this gets us right into the midst of the controversy on fertility and nitrogen; whether the latter is supplied by the atmosphere totally or partially, or whether it has to be supplied to the soil in the shape of nitrogenous manures. This brings us again to barn-yard manure and artificial manures, and the office humus plays in fertility; and this again leads to the question, Can the fertility of a soil be kept up, and can partially worn-out soils be restored to fertility, by any other means than by returning to the soil the straw and grain upon which they grew; or in other words, by barn-yard manure? And if there is any other way, is it available to our farmers, and is it profitable? It were a simple question to ask, how can you enrich land, and it is a simple one—but hard to put into practice—and one that nine farmers out of ten can tell you to-day—and that is, put on plenty of manure; and if all men who till land had done this, there would be no occasion for the Agricultural and Arts Association asking for essays on how to restore fertility to worn-out soils. But the point is, since our lands are supposed to be deficient in fertility, how can they be restored in the cheapest and most effective manner? Admitting, then, that barn-yard manure would have kept up the fertility of the soil if applied in sufficient quantities; but since it has not, we must look to something else, and see if it will answer the same purpose; and this brings us to artificial manures—Will they keep up the fertility of a soil without the aid of barn-yard manure?

The experience of Mr. John Prout, a prominent English farmer for the last twenty years, says it can, for he has made arable farming on clay land for this length of time profitable without the application of barn-yard manure. He started twenty years ago with 450 acres of poor land, and he has used nothing but artificial manures, and the result is he has made the business pay, and has doubled the value of his estate in this time. He sells all the wheat and straw by auction, and buys artificial manures. Mr. Prout's system has shown conclusively that the great supply of nitrogen, which was supposed to come from the manure applied and the soil, is, in reality, largely taken from the atmosphere. By careful experiments made by Dr. Voelcker of this soil, and the chemical analysis of the crops taken off it, it was found that Mr. Prout was only supplying soil with 38½ lbs. of nitrogen year by year, and 71 lbs. was exported from the farm in the shape of grain, etc. The question now arises, Where did Mr. Prout obtain this nitrogen? It was not from the soil, nor was it supplied in the manure, and the inference is it came from the atmosphere. If this is the case, the fertilization of worn-out soils resolves itself into simply this—supply the inorganic or mineral element, and the rest comes from the atmosphere. Now, it is well known that barn-yard manure contains for

its bulk comparatively a small proportion of essential salts (14 lbs. in a ton), such as potash and phosphoric acid. Good wood ashes have twenty times more potash and ten times more phosphoric acid than a given quantity of the best barn-yard manure. But, of course, the question arises again, Will these substances of plant food in such a concentrated form be equally distributed to become at once available? This is another point; and with this again comes the physical or mechanical condition of the land, which, strictly speaking, would not come under the subject in question, for it simply says restoring fertility; although I may say here parenthetically that I am fully persuaded that but little of our soil in the strict sense of the word is really worn out. A great quantity of our supposed exhausted soil has a sufficient quantity of plant food, but it is not available, owing to its physical condition, or in other words, for the want of proper drainage and thorough *culture*. Liebig says:—"The influence of the mechanical operations of agriculture upon the fertility of a soil, however the earthy particles may be mixed by the process, is remarkable, and often borders on the miraculous."

I know land in London township which was considered sterile and worn-out, which by drainage and thorough *culture* brought forth good crops. I have seen land heavily manured, and rich, chemically speaking, yet by bad *culture* failed in production; for this reason, I have no doubt manures often receive the credit due to good tillage; and I am strongly of the opinion that thorough *culture*, stirring the soil, is our cheapest and best manure. But this is not to the point; the supposition is that the soil lacks the necessary elements of plant food and how to restore its fertility.

No rule can be laid down which will cover every case, and which would probably become of general application. After knowing what elements the soil is lacking, and this of course would require some knowledge of agricultural chemistry and the composition of soils, and how plants live and grow, the next consideration is, how can we obtain these at the least cost, and which will yield the greatest profit? We shall have to resort to different methods of keeping up fertility, according as we find materials cheap or dear, and plant food should be bought to the same advantage and profit as dealing in any other commodity. There is no royal road to enriching land. Plant food should be considered in a commercial light, and there is no doubt science has so far advanced that a commercial article should be placed on the market containing all the elements of available plant food. Mr. John Prout finds that the commercial system of manufacturing manure, in the long run, is the cheapest, and that, all things considered, manure, whether made in the barn-yard or in the factory, was simply produced by capital and labour. Then, here again is whether our animals are the cheapest manufacturing machines of plant food, or whether it cannot be made cheaper than to make it in the barn-yard. Mr. Prout thinks the former plan pays better when the soil is below a maximum production, or what is called for in this essay on partially worn-out soils.

It is quite evident that non-productive land or partially non-productive lands will not pay to farm, as they do not produce sufficient to pay interest on capital invested when there is a minimum production. If land is so poor as not to produce enough over the cost of labour and capital to enrich itself, from what source is the manure to come? It can't be raised on the land, because (by hypothesis) it is too poor to grow anything, and the manure pile from such land may be hopelessly looked upon to supply the necessary food. As I said before, there can be no general rule laid down for restoring fertility; it will greatly depend upon circumstances, and the facilities people have of procuring manure. There are only two ways suggest themselves—either to buy manure or plough under green crops.

If manure is obtainable at anything like reasonable prices, to buy is the most direct way of increasing production. Farmers living in the vicinity of cities have easy access to manure, which can often be bought very cheaply. If our cities had any efficient system of collecting night soil, and poudrette companies were started, this would be a great source of obtaining a cheap supply of rich manure. Then there are commercial manures, which, when the carriage is not a long distance, may be obtained at paying prices; but at the ruling prices of \$40 and \$45 a ton, and then those of a doubtful purity, I do not think it would pay. If these manures were inspected and their strength tested, as it is in Germany, I have no doubt the commercial manures would be the cheaper. If our native apatite

mines in the Ottawa district were properly developed, here is an endless source of plant food to restore fertility, and it can be so manufactured as to place it within the reach of every farmer. He would want nothing else to restore his worn-out wheat lands.

A farmer should look around to every available means for obtaining plant food. There are often means within his own reach which he probably neglects to utilize. There are but few farmers that have any means of saving their liquid manure, which is allowed to drain off, and stand in cesspools around the barn-yard. This liquid manure contains more plant food—essential salts—than the solid in the ratio of 9 to 7; and hence it can be seen what a loss is sustained on nearly every farm.

Then there are ashes, the inorganic part of the plant. How many save these, and do not trade them off for a bar of soap? To a great many worn-out soils ashes have in reality all the elements that are wanting—potash, phosphoric acid and lime. Indeed, the action of ashes on potash plants, such as potatoes, corn, turnips, etc., is wonderful. I have experimented for two years on worn-out clay soil with ashes for these crops, and I have found the results in the yield corresponding to what should be expected from their chemical composition. In a country like Canada, ashes can be obtained cheaply, and if the theory of M. Ville, the noted French agriculturist, and others is correct, that the nitrogen of plants is mainly derived from the atmosphere, ashes may be looked upon as containing all the essential elements the plant receives from the soil.

Ploughing in green crops is the only remaining way left of restoring fertility to worn-out soils; but a green crop, to be of much service when ploughed under as a manure, must be the growth of not a worn-out soil, but of a soil well supplied with plant food; and green-crop manuring to be effectual should be subsequent to barn-yard or artificial manure, and should be the second step in restoring fertility. Restoring fertility, any way, must be a gradual process, and no one can expect to recuperate a worn-out soil by one or two manurings. It is easy enough to keep up the fertility of a soil by ploughing under good heavy crops of clover, buckwheat, etc., when your land is in good heart, but when it is poor is another question. Last year I saw the direct application of manure, and the ploughing under of green crops experimented with on a poor soil, and I am fully persuaded that the loss of one crop, compared with the increased production of two, will amply pay for buying manure at a high figure. Then there is another question, whether it would not pay better to cut the green crops and feed it to stock and return it again to the land.

There is no doubt that clover is the best manurial crop that can be ploughed under. The chemical effect of ploughing under clover and other green crops is simply to return to the soil all the elements of plant food that the plant lived upon. But to be of any value a crop of clover must be *good*, and not such as would be grown upon a worn-out soil.

Dr. Voelcker says:—"A *good* crop of clover, which has produced one *heavy* crop of hay, and which has been allowed to stand for seed, will add to the land a fertility for wheat, which could not be attained with the heaviest practical dressing of *guano*;" but to this he further adds:—"The clover must be treated so that it will *produce* and leave on the ground the greatest possible amount of leaf and roots, for in those two portions of the plant consists the virtue of the clover."

But, as I said before, no one means should be relied upon by the farmer to restore fertility. He should study the nature of plants and *his* soil, and draw plant food from all sources—by ploughing under green crops, using commercial fertilizers, ashes, barn-yard manure (by keeping a good stock of animals)—in fact, everything that will make two blades of grass grow where only one grew before.

Experience, a knowledge of agricultural chemistry, circumstances, and the intelligent application of capital and labour, should dictate to the farmer more than anything else which is the best practice to pursue in restoring fertility to his worn-out soils. What would be a profitable practice to one farmer might not be to another. But there is one thing certain, proper drainage, thorough culture, and a rotation of crops can be profitably practised by all our farmers, and this will make up for a great many deficiencies in not supplying plant food.

ESSAY ON RESTORING FERTILITY TO PARTIALLY WORN-OUT LANDS.

BY M. MCQUAID, EGMONDVILLE.

To which was awarded the Second Prize by the Agricultural and Arts Association.

In dealing with this subject, we shall try to stick to practical applications of the laws of nature, through the agency of the natural forces, heat, light, electricity, and the catalytic influence of the growing plant in preparing the crude and inert matter of soil and subsoil to become part of the vegetable organism, and for this purpose it will be necessary to divide soils into at least two classes, with respect to the leading features in their composition—that is, light and heavy or sandy and clayey soils. We shall assume that all partially worn-out soil has been at least moderately well drained, else exhaustion by tillage is impossible. In the case in which good and deep drainage does not exist naturally, or artificially, that must be obtained before fertility can be restored.

Sandy Soil.—In this class may be included all land in which sand of flint forms a leading feature, from about forty per cent. of its volume up to pure sand, which last is always barren. Sandy land, when lying at an elevation, is always very easily drained, and if it rests on a subsoil of sand or gravel is sufficiently drained by nature, provided a good outlet has been obtained. On this account sandy soils are easily and cheaply farmed, though such land will not prove so durable as clays, and can never be so well adapted to pasturage as a limy subsoil with clay preponderating in the soil. Although sand is necessary in all soils to form the flinty coating of the straw and grain, still when it occurs as a subsoil, and largely in the soil, manures when applied are liable to be washed out, and carried too low beyond the reach of the roots of plants, and be carried off through drainage by rains and freshets. On this description of land it is not advisable to apply perfectly well-digested manure, which is soluble in the fall, as very much will be carried off before vegetation sets in. Where thoroughly fermented manure is used it will be advisable to put it on the surface as a top dressing to some growing crop, especially grass, say just before growth starts in spring; indeed, so far as experience goes, we may venture the opinion, that this is the best mode of application on all soils and for permanent benefit. But as experience proves that very little can be done in the way of enriching worn-out land in our climate by the aid of barn yard manure, we must turn our attention to natural agencies, through the aid of growing crops which utilize nature's great store of fertilizers in the air and subsoil, for science and practice go to prove that on these the judicious farmer must depend for the permanent fertility of his soil. That what we are now about to show may be intelligible to every reader, it will be necessary to state, in a general way, what elements compose a crop, and how these are formed and taken in by the growing plant on a light soil.

Elements.—If we take a plant and burn it, part will vanish in smoke, and part will remain as ashes, which are entirely unlike the vapoury part. These ashes are the mineral, also called the inorganic part, and those which passed off in vapour the organic part. The organic part is derived mainly from the air, and the mineral or ash part from the subsoil. This fact the farmer must constantly bear in mind. If this ash be carefully analyzed it will be found to contain small quantities of lime, flint, potash, soda, iron, magnesia, manganese, phosphorus and sulphur, with chlorine; and if the smoke from the burning vegetable be carefully collected and analyzed it will show portions of three gases—oxygen, hydrogen, nitrogen, and carbon united to oxygen also in a gaseous form. These few elements constitute the farmer's alphabet, and the substances which furnish his bread and butter. As we have already said, the farmer must maintain a general supervision over the supply of these; but, unless in special and rare cases, the mineral part has been laid up in store in abundance in the subsoil, and it is our duty to see that that subsoil is in proper condition to yield the required amount as it may be demanded by the growing crop. The mineral elements of soil are never found in an uncompounded or free state in the land, but often in very complex and stubborn combinations, to dissolve which requires the potency of nature's forces, which are light, heat, electricity, free access of air, and powerful presence of the growing plant. On this hangs the necessity of drainage, for where water fills the soil or subsoil there can be no heat, no circulation of air; and under such circumstances,

the mineral elements will be effectually locked up so far as the farmer is concerned. The tap root, like a young animal under its natural instinct, will not go where it not only can get no nourishment, but where it must perish, and the result will be that though an abundance of food is in the subsoil a full crop cannot be raised—as to produce a crop just a fixed proportion of both mineral and organic parts must combine. For this reason, those low, rich lands which are undrained are only fit for corn and crops which make their growth in the heat of summer and autumn, when, by evaporation, water has become low. In an essay like this, that is intended for the general farmer, it may not be advisable to go into the modes of action of the gases of the atmosphere in the decomposition of the mineral compounds of the subsoil; they will, therefore, take it for a fact that no undrained soil can be made productive to the full extent.

The Growing Plant.—Our next great natural fertilizer is the growing plant, which nature's Great Architect has endowed with powers sufficient to melt the rocks and strain the air for a supply of food. The exact nature of this influence is not very well known; whether it is due to electricity or to some living force implanted in it is not certain; but this much is certain, that it has the power to build up its structure from the air and subsoil by certain laws imprinted on it when first called into existence. Therefore, the chief means to enrich worn-down land is vegetation. But it may be asserted that, since vegetables are continually drawing on the soil and subsoil, a continual growth of them must ultimately prove exhausting. This would be true if the whole crop were every year carried abroad. In that case the land would become exhausted; but there is the other source of supply, the air, which is public property. On the principle that the largest net takes the most fish, so the greatest area of leaf surface takes the greatest quantity of vegetable matter from the atmosphere, as living vegetables are in reality like so many nets or strainers to take the organic plant food from the air. In order to restore fertility we must constantly grow crops, and return as much of them as possible to the land. By this plan we furnish an organized body, which is much more complex than the substances from which it was derived, and it is an established law of nature that the more complex; and the greater the number of elements that enter into a body, the more readily will it pass into fermentation, and once more return to its original elements, and form food for a fresh set of vegetables. The system of ploughing in green crops is the first step in the recovery of a worn-down soil, when that land has not become too poor to grow a crop. Where a whole lot has been reduced to such a state that it refuses to produce even a crop of weeds, it will be better to let it be sold for taxes and purchase in our North-West Territory; but if it will grow even a decent-sized thistle or burdock it will come all right and yield wages for work. Then by all means get it covered with vegetation, and plough the plants under when in full bloom. The nature of the soil and latitude of the place will determine what kind of crop will yield the best results; but the principal aim should be to get a crop which will give the greatest leaf surface, the greatest amount of green matter, and the longest and thickest tap root. Another consideration in the selection of a green crop is that it should mature quickly, so as to be ready to turn down before cold weather sets in in autumn, so that fermentation may proceed rapidly, and a layer of vegetable matter be speedily added to the soil. In this respect buckwheat seems well adapted, as it rapidly yields a mass of foliage, matures in a few weeks in the warmest weather, and rots very soon, but it has the disadvantage of yielding very little root, and as a plant that fills the whole bill, must give place to clover, which is every way superior where it can be grown. When, however, a field is too poor to ensure a catch of clover, buckwheat comes in good time, and by turning that down, rolling and lightly harrowing the surface, then if the soil is one that will not heave or winter-kill, a crop of clover may be started before cold weather sets in. Should the land be sandy and no lime in it, some plaster might be sown with advantage, since sandy soils are very often deficient in lime, and clover rejoices in a full supply, while in this description of land sulphur is often in short supply, and the gypsum supplies it also. With a fair crop of clover to begin with, success will follow. When the crop has nearly come to blossom we would turn in the cattle and eat it off, which will cause it to spread and throw out more roots than if allowed to be older before it is pastured. We would allow the second growth to remain on the land over winter as a top-dressing to protect the surface roots from the frosts and

drying winds in early spring. Another sprinkling of land plaster will be useful as soon as warm weather sets in, and when the crop gets in full bloom turn down again. Now re-seed and pasture for a season, and we may calculate that the crisis has been passed. If we would raise a field to the summit of fertility, if many cattle are kept, divide the field by hurdle or some portable fence into plots, say an acre in extent for every score of cattle, and use one of these plots as a yard for milking in, and where the stock can lie overnight during the summer; after the whole field has been gone over in this way we may safely infer that that field will give an account of itself. Of all the systems of husbandry which tend to the enrichment of land, the two which especially recommend themselves are the fattening of stock for the butcher and dairying, which, when hand-feeding is used, the liquid and solid manures applied to the land that yielded the green fodder, the best results will be obtained, and the land raised cent. per cent. in fertility. So astonishing has been the results of green feeding, where manures were properly handled and used, that the statement of the facts are almost incredible to those who never tried that plan of feeding. The main difficulty lies in handling the liquid manure, which is much more valuable than the solid, for if the fluid be applied in its fresh state the salts which it contains are too caustic for plant food, and will kill vegetation, while if allowed to stand too long decomposition sets in, and much of its value is lost. If, however, both were mixed, and sufficient absorbent employed, such as dry swamp muck, leaves, and litter, to absorb all the fluid, and the whole kept from rapid fermentation until thoroughly ripe, and applied to our worn-out fields, there would be fewer complaints of worn-out land. As the best treatment of manure is a prime factor in our theme, we shall give one which very much recommends itself, and would be applicable if our population was greater and farm labour more plentiful. It is an admitted fact, plain to every one who knows anything of the results of fermentations, that the best part of manures is wasted under the treatment common in this country.

Manures.—Common Treatment Defective.—The manner of treating manures which is commonly practised in Ontario is not attended with the best advantage in restoring fertility, as we shall try to show that more plant food is wasted by bad treatment than is carried on the land, and that much of this waste is occasioned by want of knowledge, and some by want of means and time to apply the true method. Barn-yard manure is treated in three different ways in this part of the Province. One is to throw the manure in the yard during winter, and after spring work has been done turn it over and pile it up, so as to get it all heated. This is a wasteful practice, for in the process of heating a great deal of the most valuable part is driven off, and the richer the food which yielded the offal the greater will be the loss by this plan. The operation is simply a system of combustion, and unless the smoke has been caught and saved, the richest and best, or at least the part which would be first available, is given to the winds. What will be left is some charcoal and the salts. A great quantity of the charcoal is also lost in the form of carbonic acid, and the hydrogen and nitrogen in the form of ammonia. These facts may be known by any one in passing on the leeward of an exposed fermenting manure heap, when the nose will be offended by the escaping gases. So long as these gases are allowed to escape, the farm is losing. The next plan is to pile the manure in a shed or cellar, and there allow the same process to go on. The advocates of this plan affirm that less loss is sustained under a roof; but science says that this is worse than the former, since fermentation will go on, and unless the roof and walls are so close that gas cannot get through, it will escape. The heap in the open air is much preferable, as it will receive a part of every passing shower, and we know that rain carries fertilizers in it; besides, water absorbs more than its own volume of carbonic acid gas, and about eleven hundred times its own volume of ammoniacal gas, the two mostly given off by the fermenting heap. It will therefore be good husbandry to keep the fermenting manure constantly wet, and occasionally dust some plaster of Paris over it, which will assist in arresting the gases. The plaster being composed of sulphuric acid and lime undergoes decomposition, the sulphuric acid leaving the lime, and taking hold of the ammonia, while the lime combines with the carbonic acid gas to form chalk. When plaster is used with water good results should follow, as the water would carry the newly-formed compounds into the body of the pile, where they would be comparatively safe if much heat was not allowed to generate. The chalk for

sandy soil would be beneficial, but for such land as we have in Tuckersmith, with a limestone subsoil, it is not desirable, but useless waste of carbon, which is one of our most needful elements, is the one that is like to give out first, as it is the most bulky part of all our crops, and on that account is drained from the farm more than any other. If the liquid manure were collected with the washings of the barn-yard into a tank or cistern, and the manure kept constantly wet with it, an excellent article could be prepared, provided no gas was allowed to escape. A third practice exists here, which is to allow both liquid and solid parts to collect for two or three days in a water-tight trench behind the cattle, when this, mixed with the soiled litter, is thrown out in a flat pile about twice a week during winter, and the whole applied to root crops in spring. By this plan we get the whole benefit of the manure, which is generally apparent for many years, but would not be very commendable on a rented farm for a term of two or three years, as the incoming tenant or landlord would be apt to reap more than his share of the benefit. This plan, though yielding more fertility than the others, has its drawbacks, which are, that there is a greater weight to handle and cart; and another still greater, that, as it never heats, any foul seeds that may be in it, and are not well covered in the drills, are liable to grow the following season. A fourth plan of handling manure, which appears to accord with theory, and yields most excellent results, and is practised by many farmers in Ireland, is to dig out a cellar about five feet deep, and large enough to contain about twice as much as the amount of solid manure made during the winter. This is walled around and floored with stone or bricks laid in water-lime, so as to be water-tight; close by is sunk a cistern, but much deeper, also laid in cement, and capable of containing the urine which is carried into it from the stable and byres. Into the cellar the manure of three or four days' accumulation is wheeled, trampled down, covered with a layer of bog mould, clay, or sand—not sand of flint, but a sort of limestone sand, or shell marl, and the whole mass wet from the tank. After the first layer over the bottom, they collect all sorts—straw, weeds, rubbish, brushwood, litter, etc.—pack them amongst the succeeding layers of manure, cover and water as before until the end of the season, or till the cellar has been filled, taking care all the time that no steam is allowed to escape. If any vapour is noticed the place is at once covered. In our climate, where we are liable to have very heavy rains during fall months, it might be an improvement to have a small gas-pipe from the bottom of the cellar into the cistern, that any water which might collect on the bottom would run into the cistern. It is needless to say that this system produces not only a great quantity, but an article of prime value, where after standing six to ten weeks after being filled the whole mass is dug out, having the resemblance of black soap mixed with ink. This I consider the perfect article, and one which, when applied to land in liberal doses, will effectually prevent the wearing down of fertility. But whether with our long, cold winters, hurried, short springs, and scarce and costly farm labour, it could be effectually applied in Ontario, is not very certain. If it could there is money in it, and fortunes for the next generation.

Heavy Land.—What we have said regarding light land will apply, with some modifications, to clay land, with more emphasis on drainage, which, to be of most benefit, must be deeper, and laid down after a regular system—the depth to be regulated by the fall of the land, the outlet and consistency of the subsoil. All things considered, the best draining material is tiles, which should always be laid below the influence of frost, and never less than three feet and a half below the surface in the lowest place.

In clayey soils—and by that term pure clay is not meant, as that is barren and incapable of drainage; by clayey is to be understood land which contains more clay than sand. Clay is the only part of soil that of itself yields nothing to produce a vegetable, for no particle of it is to be found in the ashes of vegetables. Its office seems to be to hold other essential elements until they are taken by the plant. The elements principally taken and held by it are potash, iron, magnesia, manganese, and soda, with dark vegetable matter, and flint or sand, and so firmly are these held that unless the air is allowed to circulate freely through it the chemical and mechanical bond will not be broken, and the mineral elements that it contains remain unavailable. The element which is wanting in the generality of clay land that has been run down is carbon or charcoal, and to restore this barn-yard manure or green crops ploughed in are the main resort, when swamp muck

cannot be had in sufficient quantity. Straw ploughed under will help, but where clover will endure the winter it stands pre-eminent, and then what we have said in respect to light land will hold good; but when the clover will heave it can be sown early in spring, by having the ground well worked the previous fall, and either allowing the crop to stand over winter to be turned down and re-seeded the following spring, or ploughed under in the autumn and seeded down again in the spring following, when, if a decent crop be obtained, it may be grazed off with advantage. When clay is of a light colour, very tenacious, a liberal top-dressing of ashes, either leached or unleached, will be serviceable; while if the surface soil or subsoil contains no limestone, a good application of air-slacked lime will have the effect of loosening the surface and liberating the other elements which were held by the clay; but when limestone is present either in soil or subsoil near the surface we would apply a top-dressing of common salt, say six hundred to eight hundred pounds to the acre, and if swamp muck could be readily got, haul and spread over the surface, which could be done in the slack season of winter. Where this is impracticable, if carbon cannot be got into the land by either manure from the stable or from the swamp, then ploughing in green crops, as already stated, will be the next best alternative. The kind of crop to be used must depend on the soil and climate which regulate the bulk which can be produced. Since the same medicine will not suit all patients, so the same treatment will not suit all kinds of land. In the selection each must vary his course to suit his particular case, for scarcely any two evils are exactly alike, and though some general treatment may apply to all, yet hundreds of instances will occur when some special treatment will be called for. It may happen that some one or more of the mineral elements may be wanting, or may be locked up in some insoluble compound; or it may happen that some mineral is in excess, or in a combination destructive to vegetation, and unproductiveness follows from that cause. The farmer should have some inexpensive means of knowing what is the matter, and for this purpose Professor Somebody will say "Get your soil analyzed." We say do no such thing; for though it may sound very nice in theory, it is not only expensive but useless in practice, for the following reasons:—First, because not even a single field can be found which is exactly alike in all its parts; second, because, though a sample of each part be used, a compound of all these may not represent the general character of the whole field; third, because the quantity which can be used in the laboratory is so small, compared with the vast volume of soil and subsoil of a whole field which contribute to the growth of a crop, that the most exact analysis will not give even an approximation to the quantity of elements in that field. Professor Dana makes a calculation which will fully sustain what is here advanced, when he estimates that the average weight of nine different kinds of soil in the wet state is 126·6 pounds per solid foot; since 43,560 square feet in an acre, multiplied by the weight of one cubic foot, is the enormous weight of 5,514,696 pounds at one foot deep. He then says, "Let it be required to know how many pounds of salts of lime are contained in eight inches deep of such a soil at 2·047 of salts of lime in 100 parts," and by following the calculation shows that 75,256 pounds is the result. He further says, "This immense quantity is that contained only in the finer portions of soil; there yet remains eighty parts in every hundred of soils as undecomposed silicates ready to yield their lime to the wants of agriculture. The smallest quantities of the chemist in his analysis become tons per acre, and that which is too small to be weighed by any balance, the 'trace' only of an element, rises to an amount which astonishes by its magnitude." It may then be asked how a farmer is to know why his field, which differs not much in appearance from many others which yield well, is to be treated to make it productive? He has two methods—first, by the general appearance of the soil and subsoil; second, by the use of tests which he can apply at home. If all the dark colour has vanished, he may rest assured that vegetable matter is wanting, which will be further attested by scanty supply of straw or grass, though the grain may be plump and heavy, although not a full yield. If, on the other hand, a great depth of black mould is present, the straw or grass abundant, though of a dark colour, soft and broken-down, he may say with safety that lime and flint are deficient.

But he may like to experiment so as to gain more definite information, and be able to say what particular elements or compounds are deficient in his particular case. Then

he may proceed on a plan something like the following:—Lay off his field in ridges, so that they may be as nearly alike in soil as possible, and apply some special treatment to each, so as to determine what mineral element is lacking, supposing that vegetable mould is still present, and that the number of ridges or plots has been sown with the same grain, grass or vegetable. Let us suppose that the land is a sandy loam and seeded with clover, and we wish to know if lime is in sufficient quantity: then apply air-slacked lime to one, plaster to another, mineral phosphate of lime to a third, and marl to a fourth, salt to a fifth, unleached ashes to a sixth, and nitrate of soda to a seventh, and weigh the quantities used, and carefully note the results; make a map of the plots and note the effects in the following year on the following crop, whether grass, roots or grain. By some such plan he may ascertain what his land needs. If lime only is called for, then the pure lime will lead; if sulphur is short as well as lime, then the plaster will come to the front; if phosphorus is short and lime deficient, the phosphate, or what would be better on this plot would be superphosphate of lime, would head the list; when if it happened so, the mineral phosphates, which come much cheaper, could be applied in greater quantities, as they are slower in action and in the duration of that action. But if the marl showed good results it might be inferred that lime was the principal need; if salt came well up, we may infer that chlorine and soda were called for, but lime existed in sufficient quantities, though perhaps it needed the chlorine to bring it out; but if the ashes came to the top, potash was the substance in request; while if the saltpetre showed the best record, then soda would go a good way to satisfy the demand, in which case the salted portion should stand next in quality. By carefully conducting and varying such simple and inexpensive experiments as these, we would be able to get a more satisfactory answer from our field than could be given by the most exact analysis that was ever conducted. It may be said that there can be no need of such trial, as similar tests are every year made at our experimental farm in Guelph. Very true. But the experiments made and recorded by Mr. Brown are not conducted on a worn-down field; they are not made to determine the wants of the soil, but the effect on different kinds of crops, and in every likelihood on a soil entirely different to ours; and, however good they may be, they can be of little or no use in our case, since the land in Wellington may be chemically and physically the reverse of ours in many essential points; therefore the tests applied at the experimental farm can shed no light on our enquiry. Of course the list of trials could be extended, varied, the fertilizers mixed and the like, for two or more seasons, and on a variety of crops.

As far as the organic elements are concerned, there is little need for trial, as the only elements in this class which we could or need supply are two—nitrogen and carbon. The latter is seen in the dark colour of the soil, and is drawn largely from the air, limestone, and water; the former is generally supplied from air by the presence of a thunder-shower, and is taken in by the leaves of plants, also by rich manures. It is the presence of the mineral elements in a proper chemical condition that determines the proper adjustment of the vegetable part in the growing plant, while the plant itself is the living agent which sets up the action, so beautiful and conflicting, by which its own complex structure is built up—in whose wondrous cells and tissues are laid up those compounds so essential to the existence and development of man and beast.

We have so far given the modern, and what may be called the scientific, methods—those which can be employed by the amateur or retired gentleman. We shall now give another, which, though not having modern science at its back, still has antiquity and good sense and solid facts to confirm it. In order to carry this out properly, it implies a genuine old farmer, with his half-dozen boys and girls, more or less, and their mother still in good working order, none of whom are afraid to feed or milk a cow, or, as they say in Scotland, “muck the byre.” This plan is—on a hundred-acre lot, with say seventy acres under cultivation—to keep at least ten cows, raise their calves until two years old, by which time they will bring from \$250 to \$300. Next to a good, healthy, moral lot of boys and girls, this is the most profitable crop which can be raised on the farm, and the one which is the best guarantee that there shall be no worn-out fields. We have been told that there is luck in the mark of a sheep's foot, and we know that there is wealth where the cow treads. This plan implies a goodly bulk of fodder, which must be supplied in the form of hay, straw, roots, and grain, and also the old, much-admired seven

years' rotation, which everyone will be apt to vary according to his fancy or circumstances, but it must be so arranged that but one crop of wheat shall be raised on any field in the term. We shall suppose the seventy acres to be divided in ten-acre fields, and give what we consider the best order of rotation—ten acres of each of the following crops, to rotate in this order: *Roots, wheat, clover hay, pasture, barley, green fodder, oats*. Feed all the straw and hay and coarse grain and roots, as well as the bran of the wheat. The wheat straw may be stacked out, but the chaff must be saved in-doors, and fed by hand towards spring to young cattle or colts. The barley and oat or pea straw must be put back in the barn, and fed with the turnips, mangolds, or carrots, only in such quantity as will be eaten up clean. Oat chaff must also be separate from the straw, or waste will follow. With such a system as this, with stock enough to eat all the fodder produced, and with proper care and treatment of manure, no worn-down soil can possibly exist in this or any other country. The beautiful feature in this system is that the land is never fallow, or idle, but is continually growing some form of crop, which is nature's plan of keeping up fertility. The soil should never be naked of vegetation, for naked fields mean waste, instead of accumulating fertility. From this principle, got by experience, very many of our best farmers are now in the habit of seeding down with clover with every grain crop, judging very rightly that the young crop of roots and foliage is of sufficient value to more than pay for the seed.

The restoration and continued fertility of land can only be maintained by extraordinary manuring or rotation of crops, for very obvious reasons, which are that the same kind of crop demands precisely the same elements from the soil, and by growing it in long succession year after year, the supply of these elements must become less, and unless supplied in manure, will ultimately fail in quantity to produce a crop. By growing a variety of crops, no great drain is made on any particular set of elements, and no danger of a surplus of any accumulating in the land; therefore, roots, grass, and grain should be grown in succession, with like crops grown as far apart in point of time as possible under the circumstances. He who will grow wheat after wheat must soon go to the wall.

FORESTRY.—THE BEST METHODS OF PRESERVING OUR PRESENT FORESTS, AND THE VARIETIES OF TREES BEST SUITED FOR PLANTING.

By DAVID NICOL, CATARAQUI.

To which was awarded the First Prize by the Agricultural and Arts Association.

When we reflect how rapidly the country is being cleared of timber while the need of it in every form is daily increasing, and of the great benefits which might be derived from a general knowledge of the cultivation and properties of forest trees, as well on the score of supplying wood and shelter in our own time as of supplying good and useful timber to future generations, it at once appears obvious that the design of the Agriculture and Arts Association of Ontario, in offering prizes for essays on Forestry, is to present to the landowners and farmers some needful information as to how forest trees can be raised with profit to themselves and to their heirs. And to every thinking person it is very evident that the Association has resolved to manifest its usefulness in thus making an effort to do that which is so much calculated to increase the productiveness of the country, add to its wealth, and promote the well-being of every individual.

The time will come when tree-planting must be resorted to, and whoever would engage in it, whether with a view to profit or to the beautifying of the country, will certainly find it pregnant with intellectual improvement as well as conducive to public good. If it is true that "he who causes two blades of grass to grow where but one grew before, is a benefactor of his country," it can surely be said of him who plants a tree by the wayside, that he has done something for the good of his country.

It is cause for much wonder why so many bleak, barren, comfortless-looking farm-houses, which are seen throughout the country, are unadorned by trees, when they can be had with so little trouble, or at so comparatively small cost. A few mixed groups of trees planted around makes the humblest dwelling look cheerful and inviting.

Would a man do good to those he leaves behind him, he can do it in a palpable way by planting trees, and can enjoy a large share of the blessing himself.

It is in a great measure the want of this that causes the want of love for the country of their birth in so many of the farmers' sons, who are willing to leave the country to go almost anywhere else the first opportunity.

A poor, worn-out, treeless farm is a poor inheritance for a worn-out man to leave to his son, yet how many have struggled for the last thirty or forty years of their existence to do that very thing! If a few acres of our best forest trees are planted when a son is born, they will, if properly cared for, have grown into a fortune by the time he has grown into manhood.

Let us make a calculation of what an acre of timber might, and probably would, be worth if planted on good land. A black walnut tree, say three years old, and thrifty when planted, would after 30 years' growth be about 30 feet high and 20 inches diameter; and as the wood of every branch over three inches thick can be utilized to advantage, it would surely not be considered extravagant to expect 300 feet of timber, worth \$30 for each tree; at 30 feet apart, 48 trees on an acre would give \$1,440. But as forest trees, when young, do best being grown closely together, they should be planted thickly and thinned out as they grow.

Walnut saplings are not of much use, but all the intervening space could be planted with hickory, white oak, and white ash, which are saleable as soon as they are large enough for hoop-poles; they do fully as well as any other to grow along with the walnuts until they require all the space. Planted in rows five feet apart, and three feet apart in the row, the number per acre is 2,722. Ten years after, they can be thinned out, taking one half. If they have been well cultivated the first three or four years, they will be 15 to 20 feet high, and 4 to 6 inches through. The timber is of considerable value to implement and carriage makers; say 25 cents per tree, 1,361 trees cut out would bring \$340.25. Ten years more, half that number, being double the size, would doubtless bring as much or more money, and so on; they should be thinned out as they grow, and sold for much more than the cost of the whole, leaving the walnuts clear of cost.

Tree-planting has already become a necessity, as every one wishing to obtain good wood or good lumber of any kind knows. Black walnut lumber, which 30 years ago could be bought at \$30 per 1,000 feet, now costs \$100 per 1,000 wholesale. Red cedar is in demand at \$60 per cord for pencil-making. Good white oak, hickory, or white ash can hardly be got at any price. Basswood, birch, and poplar is now worth \$3.50 per cord for paper-making, and in a few years, at the present rate of consumption, will not be obtainable at any price. White pine lumber of good quality is now worth from \$30 to \$60 per 1,000 wholesale, and will soon be beyond the reach of the poor. The blessing of good cheap lumber cannot be any longer enjoyed in Canada.

There was a time when forests were the great hindrance to progress and cultivation. For generations the advanced settlers continued their war of destruction upon the most extended and valuable forests of the globe; and thus it is that the whole people of the country, after having been taught that their forefathers could not live with the forests, have now to learn that they cannot prosper without them. While the war upon the timber reserve was conducted with the greatest vigour, the population was sparse and poor; yet, after a century and a half of toil, it has worked entirely through the almost impenetrable wilderness, leaving but scattered fragments behind, and now, confronting an almost treeless waste, is forced to draw its supplies of an essential commodity, which requires half a century for reproduction, from a constantly and rapidly-diminishing supply for a rapidly-increasing population. Now there is a vast population to consume, then there was only a feeble one to destroy; formerly, as new sections of country were appropriated by settlers, new sources of timber supply were opened. Now the great North-west country, which is nearly destitute of trees, is being rapidly peopled; and so the advance of settlements but increases the demands upon the already diminished reserves. The absolute waste is less than formerly, but the waste and consumption are now far greater than at any former period, and no considerable effort has anywhere been made to produce, nor is any such effort likely to be made until the people meet with actual destitution and its legitimate accompaniments of sweeping winds and parching droughts.

Plantations and belts of trees are needed for shelter. The dwellers on farms which have been totally cleared are now learning by sorrowful experience what a mistake they made in cutting down every tree without planting belts for shelter of homes, orchards, stock, and grain-fields; it is now that they are realizing the fact that fruit-trees and plants which thrive well under protection will not live in exposure; the country and people are suffering for want of the protection which forests would afford. Plantations and belts of trees check the force of north cold winds which lower the temperature, and of the westerly parching winds which hasten evaporation; they also prevent the blowing into drifts of the snow, which would otherwise protect the fields with an even covering. Considering, then, the present and prospective forest products of this country only in the light of their necessity and economy for domestic purposes, is it not time that waste should cease and production begin? The growth of new forests is a slow process, and promises appreciable returns only at a distant period; but their preservation may be commenced at once, not only without cost, but with immediate advantage. Wanton destruction of trees should be immediately stopped upon all lands not required for cultivation, the spontaneous growth of trees permitted, and reproduction encouraged and protected by statutes. On all mountain ranges, on abrupt hill-sides, along the borders of streams, lakes, and waterways, in swamps, in groups and belts surrounding farms, in every village, around every rural cottage, school-house and church, on the sides of high-ways and railroads, in cemeteries, public parks, and squares, the growth of forest trees should be promoted by protection, and by planting where they do not spontaneously grow. These precautions would help to save the country from the evil effects of the absence of forests. Shall not this policy be embraced by the people, and encouraged by statesmen? Certainly no subject is more worthy of the attention of both, and no great measure of public economy can be entered upon with so little inconvenience, with so little cost, and which promises such incalculable advantages in the future.

Planting New Forests.—In their natural state trees are generally found thriving on the ground they like best: thus in wet swamps we find tamarack, cedar, balsam fir, and alder; in swamps not so wet, the elm, ash, soft maple and spruce; and on good land generally, the sugar maple, white oak, beech, basswood, walnut and chestnut; on rocky hills, the aspen, black or red oak, red cedar, hickory, and butternut; on light sandy soil, the pines have almost invariably taken possession; so, wherever plantations are desired, much consideration should be given to the suitability of the different kinds of trees to the soil and locality. For instance, red cedar can be grown to best advantage on sandy hills, planted thickly, say three feet apart; 4,500 on an acre, four-year old trees, planted in this way, after ten years' growth many of them will be large enough for fence posts (worth fifty cents each, because they will last for generations); but when timber is wanted quickly, on such land the Weymouth pine and Scotch pine would give the most satisfactory results. For swales, there is nothing more suitable than European larch and white ash, both rapid growers, and of valuable timber which is in great demand. There is a great deal of land in the country which lies uncultivated, and much more unprofitably cultivated, which, if planted judiciously with trees, would certainly in course of time return a liberal remuneration for the expenditure. Forest trees, like fruit trees, will succeed just according to the treatment they receive, and whenever anything is done in the matter it will only be satisfactory when well done; all slipshod methods will fail in this business as in any other.

As no two species of trees require precisely the same treatment in detail, no rules could be given which would properly apply to all; therefore I will give, after the description of each tree separately, what I believe to be the best methods of propagation and cultivation, also the prices quoted by dealers for seeds and young trees. A few general rules, however, will help to serve as a guide to those who have not yet given the subject much study. As the space is limited to twenty pages, I can only treat of trees suitable to Canada, and of them only the most valuable kinds, including some that are not indigenous; and knowing that the information desired is intended more for practical farmers than for men of science, I will avoid as far as possible the use of scientific terms.

Preserving Seeds.—Many kinds of seeds are readily injured by damp, or by heat, or drought, and other causes, so when they are not sown soon after they are ripe they

should be kept in a cool, dry place, of equal temperature. Seeds of an oily nature will germinate after they are many years old, while others, such as the elm, maple, and ash, retain their vitality but a very short time, and should be sown soon after they are ripe. Nuts will seldom grow after the first season; and when they are not sown in the fall, they should be mixed with sand in boxes sunk under the surface of the ground, and covered with six inches of loose earth, until the opening of spring. Seeds which do not germinate the first season after sowing, such as the red cedar, thorn, and others, should also be kept in this way, as they are apt to get dry in the seed-bed during summer, and will not start the year following. The want of knowledge on this point has been the cause of many failures.

Sowing Seeds.—Deciduous tree seeds generally do best sown in wide, shallow drills, in open field, but nurserymen generally find it best to sow all kinds of evergreen seeds in beds, with frames to support the shade screens which are required the first summer, because no evergreen seedlings can stand exposure to the sun until they have gained strength, which will be some weeks after they have sprung. The soil on which tree seeds are sown must be of a mellow and rich kind; very few seeds will ever push their germ up through a crust of clay. Fresh manure should never be applied to forest trees in any form; half an inch of fine mould is covering enough for any tree seeds, except nuts, which should be covered an inch or more. For fine seeds, such as arborvitæ, a quarter of an inch is sufficient. All seed-beds should be kept moist by frequent watering. Seeds which ripen in spring, such as scarlet maple, silver maple, and elm, and are sown immediately, come up in a few days after they are sown, and will grow a foot high before fall. They and all other such, which make rapid growth the first year, should be lifted early in the fall; heeled in and well protected during winter. Seeds which ripen in the fall, such as sugar maple, Negundo maple, and ash, should be sown late in the fall, because if they start to grow they will certainly perish by the winter.

Transplanting Seedlings.—Ordinary judgment will generally determine when seedlings should be removed from the seed-beds; they should never be allowed to get crowded, because it weakens them; vigorous growers should invariably be taken up the first year, and after having their tap-roots shortened, set out in nursery rows, three and a half feet apart and one foot apart in the row, kept well cultivated and free from weeds; as soon as they become crowded in the nursery row they should again be transplanted at wider distance, or planted where they are intended to remain. Many of the evergreen seedlings are better of being pricked out in beds, when they can be partially shaded for a time, and after two years' growth put out in nursery rows for two years, when many of them will be large enough for planting where they are wanted. Trees should never be left in nursery row more than three years without being transplanted, because they cannot then be lifted with good roots, which are very essential to success.

How to Preserve our present Forests.—Mostly all forests would reproduce themselves if they were allowed to do so. Wherever trees have been growing, seedlings of the same kind generally abound, and all that is necessary is to protect and encourage them. Thin them out and prune judiciously, and plant where there are vacant spaces. As before mentioned, the kinds which naturally occupy the ground are likely to be those best suited to the soil and locality—but not unfrequently deciduous trees will come up in place of evergreens; as the seedlings of deciduous trees make more rapid progress than those of evergreens, the ground soon becomes overshadowed and the evergreens are left behind, unless cared for in proper time. Seedlings are liable to be choked by raspberry, bramble and other shrubs, also thistles and other weeds; these should be mowed with bush scythes every summer, and the rubbish used for mulching the young trees which are to be encouraged. Some kinds, such as ash, oak, elm, basswood, birch and maple, if cut before they are very old, send up clumps of suckers from the stocks; these should all be cut away, except the best one in each clump; they will make more rapid progress than the seedlings, and should be encouraged by every means. It is well known that young trees cannot make headway where cattle, sheep or other animals have access to them at any time of the year; therefore, it is of the utmost importance that no animals be allowed in the forest where young trees are desired, until they have gained sufficient strength to be without the reach of injury; the invasion of a herd of animals for a single night will

destroy the growth of years. If this careful system of the reproduction of the yet remaining fragments of forests were attended to, we would, in an incredibly short time, have a considerable supply of timber.

Transplanting Large Trees.—Nursery-grown trees, which have been transplanted every second year, having a compact mass of roots, can be removed without much risk, even if they are large; but as such trees are expensive, it is sometimes desirable to have them taken from the natural forest. This is being done to some extent throughout the country, but comparatively seldom with success, and when one sees the careless manner in which they are often torn out of the ground, their roots mutilated and exposed, they wonder how it could be otherwise. Maples, elms and basswoods, three inches through, if carefully dug up with good roots, and planted in good soil, without having been exposed to drought, will generally grow and do well if they are watered occasionally the first year and mulched; but they should not be taken from a thicket where they have been drawn up spindling, and have the tops cut off, leaving nothing but bare pole. It is much better to get stocky trees from the skirts of the woods or other places where they have not been crowded. The tops of such trees need not be cut off, but merely trimmed into good shape, and the ragged ends of the roots cut smooth. Extra labour and time expended in getting all the roots possible with large trees, will always certainly be followed with good results. Oaks, hickories, beech, walnuts and chestnuts, generally send down a large tap-root; large trees of those sorts can hardly be lifted at once with any chance of success; but if the tap-root is cut off and part of the other roots pruned, the tree allowed to stand for a year, they can then be transplanted with a fair prospect of success. Swamp muck, after it has been pulverized by exposure and mixed with wood ashes, 1 to 20, is an excellent stimulant for forest trees, and where the soil is poor this compost should always be applied, mixing it with the soil among the roots. Old rotted manure, leaf mould, or other rich earth, can be used to good advantage where the first cannot be had. Failures are very often caused by deep planting; trees planted in a deep hole may barely live for a few years, but will never thrive well; they should not be planted much deeper than they were growing in their natural state.

Planting in Spring or Fall.—In the fall farmers generally have more time to spare than in the spring, so the work would likely be performed in a better manner. Sometimes the ground where the trees are to be taken from is so wet that there is difficulty in getting them out in spring. But trees taken from a sheltered and planted in an exposed place in the fall, being considerably injured by the operation, will certainly suffer very much by a severe winter; so perhaps the best plan is to lift the trees in the fall and lay them down flat, with their roots in a trench on well-drained ground, and cover the roots with earth to the depth of two feet; lift them early in the spring and plant in holes which were dug in the fall—the soil thrown out is then finely pulverized by the frost and is in much better condition for planting. I have planted thousands of trees in this manner without losing five per cent. The additional expense need not exceed half a cent per tree. But if trees are to be planted in the fall, it is of the utmost importance that it be done early; as soon as the young shoots have become hardened, the tree should be stripped of all its leaves and removed at once. It will then make a good deal of new roots before the winter sets in. This is contrary to the opinion of some good foresters, but whoever will try it will find it much preferable to late fall planting. Evergreens, such as spruce and balsam fir, and pines of large size, can only be transplanted successfully when they can be lifted with good roots somewhat in proportion to their size, and this can be most satisfactorily accomplished by root-pruning the year previous to lifting. Cut a circle all around the tree with a sharp spade, $1\frac{1}{2}$ to 2 feet from the trunk, about the middle of May; let stand for a year, and a compact mass of fibrous roots then formed will almost insure success. The best time to remove them is from the middle to end of May, just before the buds have expanded to a tender shoot—the roots then being in active growth. The next best time is in August and September, after the young shoots have become hardened. Watering is very essential in summer, because they cannot endure drought when newly transplanted. In New England villages there prevailed for many years a custom of having an annual festival, devoting a day to tree-planting, and I would recommend the plan as being preferable to Government bounties.

Hedgerows and Hedges.—For hedgerows, the Norway spruce is fully better adapted than any other, because its lower branches do not die so soon as those of the other varieties; it also bears pruning better and grows more freely. Next in point of merit is the balsam fir, a free grower, and stands crowding better than the black spruce; but where rapid growth is wanted, the Negundo maple I think preferable to any other; it is very hardy, and when young sends out shoots 6 to 8 feet, sometimes more, in a season. The abele, poplar and black locust make very rapid growth and are handsome while young, but the objections to them are that they send up suckers so freely. Some, however, think this commendable, because they are continually reproducing themselves; but in loose soil they are much cause of annoyance. Formidable hedges of beech, hornbeam, thorn and buck-thorn I have raised with satisfaction to my employers, but of willows of any kind, never; nor are they to be seen anywhere. There never was a greater fraud imposed upon the farmers of Ontario than that of the white willow, except that of lightning rods. Willows are very rapid growers to be sure, but they are very short-lived when crowded close enough for a hedge, and make a very uneven, unsightly appearance, even when cut back every second year. Any kind of tree or shrub will make a better hedge than willow. Common barberry is very well adapted for this purpose, and I think is decidedly preferable to anything else; it grows freely from seed, is very prickly, and is easily kept in good shape; is perfectly hardy, seldom or hardly ever attacked by insects or vermin of any kind.

For ornamental hedge there is nothing equal to arborvitæ (white cedar), and the common American makes the best hedge. It will thrive well on almost any kind of soil, is very hardy, bears close trimming, does not die away at the bottom, and is seldom infested with vermin. It can be transplanted any time from the middle of May to end of September, and should not be allowed to suffer from drought. Failures in hedges are generally caused by want of proper protection from cattle and other animals, and attention to pruning at the proper time. All hedges should be trimmed at least once a year, and that should be done in July or August. Cultivate well and keep free from weeds until the hedge is thoroughly established. Want of space prevents me treating of the hedge plants.

Of Soils and Mulching.—Soils of a loamy or loose nature can be worked at almost any time, provided they are drained so that water will not stand near the surface; but it is not so with clay land. It must not be worked when wet, and it cannot be worked when dry, and even when you dig holes for trees when it is in a medium state, the soil thrown out will be so hard in a few hours that it is not fit to be put about the roots of trees; hence the necessity of having the holes dug in the fall. The soil then thrown out will be in much better condition for spring planting. But clay land which is not under-drained is always wet in spring and fall, and in a dry time becomes very unfit for trees of any kind, unless something is done to obviate the difficulty. In the first place, it must be drained, so that at no time the water will stand in the holes whatever time they are dug, and the more thoroughly drained the better; being so, the soil can be kept loose round the trees for a few years after planting. On ground of this kind mulching is of the utmost importance, because it in a great measure does away with the necessity for watering, which, on clay land, has not the beneficial effects which it has on land of a loose nature. It matters little what kind of mulch you apply—whatever is most convenient—tan bark, sawdust, swamp muck, rotten straw, or green grass; but by all means mulch when you plant large trees. Small trees planted out in either nursery or forest rows to any large extent, could not be mulched to much advantage, but the land to be occupied for this purpose must be thoroughly subsoiled, and that cannot be done with clay land unless it is first thoroughly under-drained. The frequent working of ground by the horse cultivator and hand hoe keeps the ground loose and moist. The trees seldom suffer by drought when this is done.

Pruning Forest Trees.—Deciduous trees, which have had their tap-roots cut off, are not so much inclined to make straight, upright growth, as when grown from seed without having been transplanted; therefore some kinds, when in nursery rows, require to be pruned annually, or else they will assume a spreading shape not desired in forest trees. Any that become crooked or scrubby should be cut off by the surface, in order that they

may start a straight shoot. But it is never advisable to trim up to a whip; they need leaves while making roots. Ordinary common sense will guide most people on this point. Encourage the leading shoot, and have only one.

Evergreens need but little pruning when small, but they are apt to put out two or more leaders. The spare ones should be cut back as soon as perceived, unless they are wanted for hedges. If wanted for timber they will be planted thickly, which causes them to grow straight upward. The lower branches soon die, and, of course, should be cut off. Sometimes it is necessary to prune large trees in order to get the shape desired. There is no better time to do this than the beginning of summer. The wounds will be soon covered up when the tree is making new growth.

The following are some of the most valuable kinds of trees which are best adapted to the climate of Canada, arranged alphabetically, according to their botanic names. The descriptions will be plain as possible, and limited space compels me to make them short:—

Acer Saccharinum (Hard Maple, Sugar Maple).—This well-known tree possesses many excellent qualities which entitle it to a foremost place in permanent plantations. It is the most durable of its numerous species. As a sugar tree it is the best, its sap being richer in saccharine than that of any other forest tree. For fuel its wood is unexcelled. Being very hard, it takes a fine polish, and often produces curly and bird's eye maple, much used in cabinet work and for many other purposes. It is a beautiful shade tree, and grows to a large size and lives to a great age; prefers a calcareous soil; leaves five-lobed; flowers greenish yellow, appearing with the leaves; seeds ripe in autumn; seed wings broad. Sow late in the fall or early in spring, take up the seedlings when one year old, heel them in carefully, and protect them during winter. Transplant to nursery rows in the spring. Dealers' price of seed, \$1.25 per lb.; trees, one to two feet high, \$2 per 100.

Acer Rubrum (Scarlet Maple, Soft Maple) is a more rapid grower than the former species, makes equally as fine a shade tree, but the wood is not so valuable, being soft. It is much used in carvers' work; also used in cabinet work, and for waggon and carriage making; produces fine curly and bird's eye maple; prefers a moist soil; leaves, three to five-lobed, whitish underneath; flowers generally scarlet but sometimes yellowish, appearing very early in spring before the leaves. There are many varieties of this species. Seeds are ripe in June; sow soon after seeds are ripe; treat seedlings same as hard maple. Price of seed, \$1 per lb.; trees, one to two feet high, \$2 per 100.

Acer Dasycarpum (White or Silver Maple).—Also a rapid-growing tree, which prefers a moist soil; makes a fine shade; leaves deeply cut, five-lobed, deep green above and silvery white underneath; flowers reddish yellow, appearing before the leaves; wood is fine grained; also produces curl and bird's eye maple; seeds ripe in June; sow soon after the seeds are ripe, and treat same as first species. Seeds, \$1 per lb.; trees, \$2 per 100.

Acer Negundo (Negundo Maple, Red River Maple).—Sometimes called Negundo Aceroides; grows very rapidly when young; ornamental; much used in North-West as shade tree; does not grow to large size, but when shade and shelter is wanted quickly this tree is uncommonly well suited; seeds ripe in September; sow late in fall or early in spring. Price of seed, \$1 per lb.; trees, one to two feet, \$2 per 100.

Esculus Hippocastanum (Horse Chestnut).—A native of Asia. This species is the only one belonging to this genus worthy of cultivation, and it only as an ornamental tree, but its handsome foliage and beautiful clusters of flowers have gained for it universal admiration. It is not perfectly hardy, but stands well in sheltered situations near the frontier of Ontario; leaves digitate; leaflets seven. The nuts are enclosed in a hard shell, and ripen in the fall. As soon as gathered they should be mixed in sand in boxes sunk in the ground, and covered slightly until spring, when they should be sown in single drills and covered with loose soil two inches deep; when two years old, lift from seed bed, shorten tap-roots, and plant in nursery rows. Price of seed, \$2.50 per bushel; trees, two years old, one and a half cents each.

Betula Alba (White Birch).—This is a slender-growing tree with white bark, small triangular leaves taper pointed; seeds, which ripen in summer, are produced in catkins. Seeds, being very small, should not be covered more than quarter of an inch with fine mould. Sow early in spring; seeds as soon as gathered should be mixed with sand and

kept in a cool place until sowing time. There are several varieties of this species, all of which are very beautiful ornamental trees; some of them are natural weepers. One is called the cut-leaved weeping birch, a very graceful weeper, well adapted for prominent positions on our lawns—this variety does best when budded on stocks of the common variety, which is readily propagated by cuttings taken off in the fall, buried during winter, and set out in early spring in moist loamy soil partially shaded. This tree does not grow to a large size; the wood is used chiefly for turners' work. Seed, 50 cents per ounce; trees, one to two feet, \$2 per 100.

Betula Nigra (Black Birch) is a tree well worthy of a place among our forest trees. It thrives in any kind of soil, and on the most barren ground; grows to large size, and the lumber makes a tolerable substitute for black walnut, and may be cultivated in the same manner as the former species to great advantage. There are several varieties of this birch, such as the broad-leaved Virginia, brown birch, etc.

Betula Papyracea (Paper Birch) is the only other species worthy of special attention. The bark of this tree is very tough, and is used by the Indians for making canoes; leaves large, heart-shaped, pointed; wood is fine grained and white.

Castanea Americana (American Chestnut).—Considered to be same species as the *C. Vesca*, although there seems to be quite a difference in the size and quality of the nuts. Asa Gray classes them as one species. This tree is not now very common in Canada. I have never seen it further east than Brockville, where a few years ago some fine specimens were growing on the rocky hillsides near the shore of the St. Lawrence river. It is found abundantly along the shores of some of the western rivers and in Niagara district. It seems to thrive best at the base of rocky hills and other sheltered localities, and it is doubtful whether it could be grown to advantage far north of the frontier of Ontario, and even there it must have good loamy soil. It will do no good on cold clay land. It is a tree of very handsome appearance, having large dark green leaves five to seven inches long, tapering at both ends, coarsely serrated; bears abundantly; nuts worth \$5 per bushel. The tree grows to a large size, and the timber is valuable for many purposes, such as cabinet-making and house-finishing. Fertile flowers, very small, in clusters, enclosed in a scaly involucre which surrounds the nuts. The sterile flowers are in long naked catkins in clusters. The nut proper is enclosed in a thin horn-like covering, and ripens in autumn. The nuts as soon as gathered should be mixed in sand in boxes buried in the ground, lightly covered until spring. Sow in single drills, cover one inch with loose soil. Frequent transplanting of the seedlings while young is necessary to ensure safe removal as they attain size and age. Price of nuts, \$5 per bushel; trees, one to two feet, \$2 per 100.

Carya Alba (Shell-bark Hickory, White Walnut).—This and all the other hickories were formerly classed with the genus *Juglans*, but according to Asa Gray are a distinct genus. This species is well known on account of the value of its timber, which is exceedingly tough and durable. For elasticity and strength combined there is nothing superior to good hickory. There are many varieties of hickory, all valuable for trees ornamental as well as useful. They are not a rapid growing tree, but can be used to good advantage before they grow large. This variety has leaflets five to seven inches long, lanceolate, serrated; nut enclosed in a thick leathery husk, medium size, surface uneven, shell thin and white, kernel rich and sweet; bark shell-like; wood heavy and elastic. The *C. Sulcata* (thick shell-bark), *C. Tomentosa* (mockernut, white heart hickory), *C. Microcarpa* (small fruited) and *C. Glabra* (pignut), are all of beautiful foliage and excellent timber; thrive well in Canada on dry loamy or sandy soils; nuts ripe in autumn; should be mixed in sand in boxes buried until spring; sow in single drills; transplant seedlings when one year old; after shortening the strong tap-roots, frequent transplanting to ensure success. Price of nuts, \$3.50 per bushel; trees, two to three feet, \$2 per 100.

Carya Amara (Bitternut, Swamp Hickory) is a very graceful tree, with branches; terminal buds covered in winter with a yellow pubescence; wood not as valuable as that of the other species; leaflets seven to thirteen, oblong, lanceolate, serrate. Nuts nearly round, very bitter; tree grows in low, moist lands.

Fagus Feruginea (White Beech, Common Beech) is not one of the most profitable trees to plant for timber; still anyone contemplating planting forest trees on a large

scale should not overlook it, because it has many excellent qualities; the wood is extremely hard, and is almost exclusively used for making wood-work of mechanics' tools. The tree grows to a very large size, and lives to a great age; its beautiful dark green foliage and graceful habit make it a desirable ornamental tree. Leaves entire, oblong, ovate, serrate, furrowed. Nuts triangular, produced in pairs, enclosed in a rough, hard husk; kernel sweet and rich, ripe in autumn. Mix in sand, keep in a cool place until sowing-time in spring; transplant seedlings frequently. There are several varieties of beech, which are quite distinct. The purple-leaved, cut-leaved, and weeping beech, they are propagated by budding on the common stock or by layering, and are only planted as ornamental trees. Price of budded trees, \$4 per dozen; common, one and a half to two feet, \$2 per 100.

Fraxinus Americana (White Ash) is a noble tree, one of the most valuable, and deserves the special attention of those who would grow trees for their timber. In a moist, deep soil it grows very rapidly; the wood is much used by manufacturers of agricultural implements, and is also in demand for exportation at high prices, and there is no doubt it could be raised in plantations, yielding a very large profit. The ash has a pinnate leaf, divided into leaflets seven to eleven. Seeds very abundant, ripe in autumn; should be sown soon after they are gathered, because if they are kept dry all winter, and sown in spring, they will not come up until the year after. Seedlings easily transplanted, grow very rapidly, and soon become saleable.

Fraxinus Pubescens (Red Ash).—Timber inferior to that of the white.

Fraxinus Sambucifolia (Black Ash).—A tall, slender-growing tree, with coarse-grained timber; separates readily into layers; used by the Indians for basket-making; grows in low, wet ground. These are the only species worthy of cultivation in Canada. There are several foreign varieties which are worthy of growing as ornamental trees; these are budded or grafted on the common stock.

Juglans Nigra (Black Walnut).—This tree is now attracting a good deal of attention on account of the scarcity and high price of the lumber. Trees are not available for this purpose until they attain a large size; so a man would be old before he could reap the benefits of his own planting, even if he commenced early in life; but, as mentioned at the introduction of this article, a plantation can be made to pay its way. And as men generally calculate to lay up something for their children, a forest of this tree would perhaps be as safe an investment as railway or bank stock, with less risk of being fraudulently manipulated by unscrupulous executors. It grows rapidly on rich loamy soils, makes an excellent shade, and is quite hardy. Four hundred yards from where I am writing stands a tree of enormous size, over eighty years old, and perfectly healthy, the timber of which is worth at least \$100. There are several varieties of black walnut, some of the nuts being much more bitter than others. Plant the nuts in autumn, or, what is better, mix them in sand, in boxes sunk in the ground, until planting time in spring; transplant seedlings when one year old in nursery rows, or where they can be well cared for. The nuts may be planted where they are wanted to grow, and if the soil is deep and rich, the trees will make more rapid progress than by being transplanted, and they will be straighter and more upright. Nuts prepared for planting, \$2.50 per bushel; trees one year old, seven cents each.

Juglans Cinerea (Butternut) is also well worthy of cultivation; does not grow so large as the former species; the wood is of a light-brown colour, coarse grained, much used in cabinet work; leaflets fifteen to nineteen; nuts oblong, enclosed in a clammy husk; kernel sweet and rich; grows on high, dry land, but thrives best on rich loamy soil.

Larix Americana (Larch, Tamarack).—The larch, according to Linnaeus, belongs to the coniferae, and is called *Pinus larix*; nevertheless, it sheds its leaves in the fall, and is here classed among the deciduous trees. It is a rapid-growing tree, which thrives best on low land; is valuable for the straightness of its timber. But the European larch is a much more valuable tree in every respect; it grows still more rapidly, grows to a much larger size, is better timber, and thrives on almost any kind of soil; timber useful for building, for ship masts and beams, and many other purposes. This tree is uncommonly well adapted for making plantations on poor lands, where manure cannot be had to make farming profitable. Thousands of acres have been planted with it in England

and Scotland, and are being planted, and it has proved to be a profitable investment ; and, be it observed, plantations of larch do not impoverish the land, but improves it. The annual deposit of leaves gives more nutriment to the soil than is taken up by the trees. Timber should be cut in early spring, and the bark taken off, because the bark left on causes the timber to decay ; this timber will last under water for many generations. Seeds are produced in small cones, ripe in autumn ; gather the cones as soon as they are ripe, expose them to hot sun for a day ; they will open, and the seeds are easily shaken out. Sow in spring, in beds partially shaded ; transplant when two years old in nursery rows. Price of seed, \$1.75 per lb. ; trees twelve to fifteen inches high, \$2 per 100.

Populus Balsamefera (Balsam Poplar) is also a tree of very rapid growth ; wood is of comparatively little value, except for barrel staves and paper-making, but when shelter is wanted quickly, it answers a good purpose ; its large buds are covered in spring with a resinous matter, often used for medicinal purposes ; another variety of this species is called Balm of Gilead, common as an ornamental tree. The abele, or white poplar, is also useful for making shelter rapidly, but its tendency to send out suckers, and the down thrown from the flowers in spring, are objections to its use in some places ; this is called the silver poplar ; leaves dark green above and silvery white underneath. There are several other American and foreign species, but none of them of much merit, except for the purposes mentioned. The *Populus Dilata* (Lombardy Poplar), a tall, spiral-growing tree, useful for making screens when planted closely together. The *P. Tremulus* (Shaking Poplar, Aspen) does not grow to large size ; its wood is in demand for paper-making ; has beautiful small, heart-shaped leaves, having a long, slender stem, and almost continually on the move ; this and all the other poplars are easily propagated by cuttings, one, two, or three years old ; set out in rows, in moist soil, will form trees in two or three years.

Quercus Alba (White Oak) has been termed the king of the forest, and certainly its magnificent appearance, and the value of its timber, entitle it to a foremost place. Good white oak timber is now very scarce, and in great demand for exportation, as well as for many important uses at home ; in the manufacture of farm implements and mill machinery it is almost indispensable ; yet, unless plantations of it are raised soon, the country will be without it. This variety is known by its bright green, oblong, obtuse-lobed leaves ; the tree grows to large size, and lives to a great age. There are many different species of oak, but limited space permits only mention of a few of the best. The oaks are all easily grown from the acorns, which, as soon as they are ripe in autumn, should be planted in single rows in good rich soil, and covered two inches ; they should be transplanted when one year old, because they produce a very strong tap-root, which, if allowed to grow two years and then cut off, stunts the growth of the tree. Price of trees, three years old, \$10 per 1,000.

Quercus Obtusiloba (Post Oak), a medium-sized tree, does well on poor soil ; timber very tough, but not so valuable as the white oak ; leaves five to seven inches long, with five to seven roundish lobes ; acorn oval, half an inch long.

Quercus Tinctoria (Quercitron Oak) does very well in Canada ; wood reddish, coarse-grained ; tree grows large, used for hewn timber ; leaves deeply sinuate, pinnatifid ; acorn large, round, three-quarters of an inch long ; cup shallow.

Quercus Rubra (Red Oak), a large-growing tree, with large, oblong leaves ; acorn large, ovoid, set in shallow cup ; wood coarse-grained, not formerly considered of much value, but now much used in cabinet work ; grows well on rocky hills.

Robinia Pseudacacia (Common Locust) is a native of Virginia ; valuable on account of the durability of its timber, being next to red cedar in this respect. In Canada, however, it has been grown chiefly as an ornamental tree, being of handsome foliage, and having an abundance of large clusters of pinkish white flowers, emitting a rich perfume ; the suckers which it sends out sometimes become troublesome ; it is infested by a kind of borer ; thrives well on poor sandy soil ; all the other *Robinias* are comparatively short-lived ; easily raised from seed sown in the fall. Price, \$1 per lb. Transplant seedlings frequently.

Tillia Americana (Linden, Basswood) is a tree deserving special attention ; it is easily

raised, grows quickly, handsome foliage, very ornamental, makes a fine shade; wood is soft and very light; valuable for carving, carriage making, cabinet making, and many other purposes; the inner bark is easily separated from the outer by being soaked in water a few weeks; this inner bark is much used by gardeners for tying up vines, plants, etc.; its flowers bear a large amount of the best quality of honey. This variety is much superior to any of the others (the European variety is not perfectly hardy—apt to perish in severe winters); the seeds ripen early in autumn, and should be sown soon after they are gathered. Seedlings produce many fibrous roots, and are easily transplanted. Price of two-year-old trees, \$1.50 per 100.

Ulmus Americana (White Elm).—A noble, majestic, wide-spreading, graceful tree, with profusion of slender, drooping branches; should have a place wherever two trees are planted, being next in importance to the white oak; it is the largest growing of the native elms, often growing eighty feet high, with trunk of six or seven feet in diameter; the wood is tough, and much used in waggon and carriage making and in ship-building. The seeds ripen in June, and must be gathered from the tree as soon as ripe, because having thin membranous wings, they are soon blown away; they should be sown immediately, and will make a foot or more growth the first season. Seedlings should be transplanted every second year until they are planted where they are to remain. Price of trees 2 to 3 feet high, \$3 per 100.

Ulmus Fulva (Slippery Elm).—Tree of medium size, leaves ovate, oblong, serrate, thick; wood rather soft, but tough; grows on low ground.

Ulmus Racemosa (Rock Elm, Corky Elm).—Trees, when young, have corky ridges of bark; leaves small, oblong, lanceolate; young buds downy, wood tough, fine-grained, very useful; this and all the other elms require almost the same treatment as the first, except the weeping, or Camperdown, which is budded or grafted on common stock. Elms thrive best in deep, rich soil, and require plenty of room—indeed they will make room for themselves.

EVERGREEN TREES.

The timber of evergreen trees is not generally considered of so much value as that of deciduous trees, but the trees are of more importance for shelter, because they retain their foliage during winter, when shelter is most needed, and for the same reason they cannot be said to be less ornamental; and it is doubtful whether as much general benefit has ever been derived from any one kind of timber as from that of the white pine alone. Some of the others are very valuable, and I regret that want of space prevents me enlarging on their merits.

Abies Balsamea (Balsam Spruce) grows naturally on wet land, but will grow on almost any kind of soil; is inclined to grow tall and slender, and when used for shelter belts should be planted closely; wood is not of much value; the Canada balsam is taken from this tree, which it produces abundantly; the seeds of this and all others of its tribe are produced in cones, ripe in the fall; should be gathered as soon as matured, because when these open the winged seeds are readily blown out by the first breeze of wind. To get the seeds out of the cones, it is only necessary to spread them out on canvas, exposed to hot sun for a few hours; the cones will open and the seeds are easily shaken out. The seeds may be kept in a cool, dry place for years, but their germinating powers are somewhat weakened by age. Sow early in spring, in beds made of fine friable soil, partially shade; let them be exposed to the sun gradually, until they gain strength; protect seed bed during first winter by thin covering of leaves; transplant seedlings in May to nursery rows when they are two years old.

Abies Nigra (Black Spruce) is variable in appearance; sometimes the foliage is dark green, others are of a yellowish green; tree grows large, and its wood is of more value than that of the previous kind; the double spruce is only a variety of this species.

Abies Excelsa (Norway Spruce) is a much superior tree to either of the former; grows more rapidly, is much more graceful, the under branches do not decay like those of the others; tree retains its beautiful proportions until of great age; grown as timber, the wood is valuable for building purposes; grows to a great size; pitch, tar, resin and turpentine are produced by this tree; its beautiful bright green foliage and graceful habit

makes it a desirable ornamental tree ; no evergreen tree would afford so much satisfaction, or yield so much profit in Canada, as the Norway spruce. Seeds can be had from almost any tree seed dealers for \$1.40 per lb. ; trees 9 to 12 inches, \$2 per 100.

Abies Canadensis (Hemlock Spruce) is the most beautiful evergreen we have ; its delicate, dark green foliage and graceful habit entitle it to a foremost place as an evergreen ornamental tree ; timber is coarse-grained, excellent for siding and roofing for buildings ; the bark is now of great value for tanning purposes ; seed is produced abundantly in small cones, ripe in the fall ; sow in spring, in beds ; shade from hot sun and water frequently ; transplant every second year until planted where they are to remain. However strange it may appear, this tree does not stand exposure well when newly transplanted. Trees taken from a sheltered and planted in an exposed place in our climate, without protection the first winter, will invariably perish. It is necessary, therefore, to surround them with something, such as evergreen branches stuck in the ground, before the winter sets in ; the superiority of the tree will repay any extra trouble. When once acclimated, it endures the winter without perceptible injury ; it prefers a light, dry soil ; will not do well in heavy clay.

Juniperus Virginiana (Red Cedar) has this to recommend it—it is the most durable of all Canadian timber. I have in my possession a quantity of red cedar wood which served in the capacity of fence posts for over 90 years without the least sign of decay, except the thin layer of sapwood. It is not a rapid grower, but can be used as soon as the young trees are large enough for fence posts. That will be in eight or ten years after planting, if grown on good deep loamy or sandy soil. It will do no good on heavy clay land. It also makes a very desirable ornamental tree when not crowded. It is well worthy of a place in every group where variety is wanted. Gather the berries in autumn, mix with sand in boxes sunk in the ground, cover slightly until following fall, then sow in beds of good sandy mixture ; transplant seedlings every second year until large enough for planting permanently. Price of seed, \$1 per lb. ; trees 12 to 15 inches, \$3 per 100.

Pinus Strobus (White Pine, Weymouth Pine).—Among all the numerous family of pines, there are none to excel this species in point of usefulness. It is a rapid-growing tree, which grows to large size. Fortunately for Canada, it is one of the few kinds which prefer our northern climate. Its lumber has brought much wealth to Canada, and the demand for it increases. Leaves slender, five in a sheath ; cones, four to six inches long. Pine cones do not mature the first year ; the tree bears two crops at one time. The cones of this and all the other pines should be gathered before they open in autumn. When exposed to the sun, they will open and allow the winged seeds to be threshed out. The seeds can be sown in fall or spring, and covered half an inch ; shade from hot sun and water moderately ; transplant every second year until large enough for final planting.

Pinus Resinosa (Red Pine).—Known in Canada as Norway pine. Leaves stiff, three to four inches long, in twos ; cones two inches long ; scales not pointed. Tar, resin and turpentine are made from this tree. Timber hard ; used for flooring and other purposes.

Pinus Rigida (Pitch Pine). Leaves three to six inches long, in threes ; cones two to three inches long, hanging long on the trees ; tree grows to large size ; wood firm, resinous ; also produces tar, turpentine and resin.

Pinus Sylvestris (Scotch Fir) is well adapted for plantations on high and dry grounds ; does well on poor sandy soils ; is perhaps the hardiest of all the pines ; tree grows to large size ; wood firm and strong ; valuable for masts, for building timber, and many other purposes. Pitch and tar are also got from this tree by incision. This tree lives in Scotland to the age of 400 years. Leaves in twos ; cones ovate, the length of the leaves.

Pinus Austriaca (Austrian Pine) is also a very hardy sort, and well worthy the attention of intending planters. Leaves in twos, four to five inches long ; rigid tree, rapid grower, and handsome appearance ; thrives uncommonly well in Canada. Price of pine tree seeds are generally from \$1.75 to \$2.25 per lb. ; tree seedlings, from 10 to 15 inches, from \$2.50 to \$5 per 100.

It should be observed that pines should be planted out permanently when they are very young—say about a foot high. They make more rapid progress than those planted of a larger size. In order to insure success plant small trees, and never, under any cir-

circumstances, expose the roots to the sun ; dip the roots in mud puddle as soon as they are taken out of the ground ; handle them in moist, cloudy weather. This remark applies to trees of every kind, but more particularly to evergreens.

Thuja Occidentalis (Arborvitæ), commonly known as white cedar, belongs to a very numerous class, but space will not permit mention of them all. There are some of them of more importance to us than our own native. It is well worthy of cultivation, on account of the usefulness and durability of its timber. It is also a handsome ornamental tree, and makes the best ornamental hedge. Easily raised from seeds, ripe in fall ; being small, should be covered lightly with fine sandy soil ; shade from sun while tender ; easily propagated from cuttings in summer time ; keep partially shaded under glass ; protect in winter by covering of leaves. The Siberian Arborvitæ is of more compact habit and of slower growth ; perfectly hardy, handsome variety. Arborvitæ are now divided into two classes : the *Thuja* class produces winged seeds ; the other class, called *Brota*, produces wingless seeds. To this class belongs the Chinese and Tartarian Arborvitæ. Price of seed, \$3 to \$5 per lb.

There are many other evergreens which can be grown in Canada, but those mentioned are the most desirable.

FORESTRY.—THE BEST METHODS OF PRESERVING OUR PRESENT FORESTS, AND THE VARIETIES OF TREES BEST SUITED FOR PLANTING.

By P. E. BUCKE, OTTAWA.

Awarded the Second Prize, and read before the Agricultural and Arts Association, at London, September, 1881.

In the earlier days of the Province of Ontario (Upper Canada), if any one had argued restrictions on the destruction of timber, he would have had few to listen to him. Amongst the earlier settlers the destruction of trees was looked upon as one of the cardinal virtues. The superabundance of timber led to this state of things, and it is now found difficult to check the rapid wasting away of our forests.

Fifty years ago the trees standing in and around your "Forest City" were the admiration of strangers. Mr. J. C. Loudon, writing at the date referred to, states that "the white pine near New London has a trunk varying from thirteen to eighteen feet in circumference, and some trees which had been blown down were measured and found to average one hundred and sixty feet in length. The oaks varied from ten to fifteen feet round the trunk, with fifty feet of clear stem. Mixed with these were beeches, birches and ashes ; horizontal sections of white pine and hemlock spruce exhibited between 300 and 400 annual rings, oaks 200, elms 300." The memory of the writer reaches nearly back to the time and place referred to, when, in the language of the American poet,

"His echoing axe the settler swung
Amidst the sealike solitude,
And crashing, thundering down were flung
The Titans of the wood."

When the pioneer looks back, what changes present themselves in the past fifty years. The goose which laid the golden egg is being rapidly strangled, and it is now declared, by people best able to judge, that the work of wholesale destruction of the forests of the country is being carried on without any new growth of timber being produced, to take the place of that removed. The Government, which has for a long time lain in a partially dormant condition with regard to this subject, is now awakening from its lethargy, and it is trusted that this immense industry, second only to agriculture in this Province, will at length receive the attention its magnitude deserves.

The subject is a practical one, and must be approached in a practical way. Besides the use of trees for timber, it is now generally conceded that they have certain influences which assist in the harmonizing of the laws of nature. For instance, trees, by the absorption of carbonic acid gas and the emission of oxygen, assist in purifying the air we breathe. By

interposing their foliage between the sun and the earth, they shelter the latter and equalize the temperature of earth and air. They cover the earth with leaves, which, when decayed, make a most nutritious soil, and in the meantime guard against a too rapid evaporation of water. Trees also serve to protect both the ground and human habitations from cold and destructive winds. The evaporation from their leaves, by cooling the atmosphere, has the effect of increasing the frequency of showers, and also assists in the precipitation of dew. It will be seen in the manner above described that forests subserve a most beneficent purpose. Apart, however, from these considerations, and their utilitarian or revenue-producing qualities, trees are the most majestic and imposing of nature's vegetable kingdom, and no view in any country is an object of beauty without them. It is noticed in the Report of the Commission on Agriculture, just issued, that the County of Kent is beginning to decorate its roadways by the planting of trees. Nothing can show a higher state of civilization or a greater love of the beautiful than tree-growing for ornamental purposes. But besides harmonizing the influences of nature, and adding their graceful forms to the grandeur of the landscape, there is a wealth in trees which few can realize who have not had some share in the export timber trade of this country. In 1872, circulars were prepared and sent to all millowners and others in Ontario, to ascertain the amount of timber cut. When the returns were received, square timber, logs, deals, etc., were reduced to board measure, and the estimate based on these returns showed a production of 750,000,000 feet, and it was calculated that of this quantity from 85 to 87½ per cent. was exported and the balance used in the country. The produce of the forests of Ontario since then is supposed to have declined.

The revenue derived from timber by the Crown Lands Department of this Province averages nearly \$400,000 per annum, and the latest returns give an area of a little over 16,000 square miles of territory under license to parties for cutting timber.

The actual amount of timber in Ontario and the territory covered by it is a subject of the utmost importance, as the wealth of this Province, like most other new countries, is represented not so much by its manufactures as by the products of the soil, and these are derived from three sources—namely, agriculture, mines and forests.

The enormous waste of timber by bush fires is quite incredible to those who have not witnessed the devastation of pine lands by this destructive element. These originate through careless settlers, hunters who camp in the woods, and sometimes, though rarely, by the lumbermen themselves, or by surveyors, who make smudges to ward off the attacks of flies and mosquitoes. These fires, started during a dry season, are only stopped by large streams, lakes, swamps, or by heavy and continuous rains, and are much more destructive than the shantyman's axe, because where the latter culls the good timber and leaves the small trees for future years, the former destroys both timber and soil, leaving a barren waste, the pines being usually replaced by a scrub growth of birch and poplar. Stringent laws have been passed by the Ontario Legislature against the originators of these fires, but unfortunately no sufficient machinery has been organized to put these laws in force, though petitions have from time to time been forwarded to the Local Government by the millowners and lumbermen, who are in every way interested in their suppression. It is estimated that more timber has been destroyed by bush fires than has been exported altogether from the country.

It is evident that if these fires could be suppressed, and the young trees which are left on the pine lands after the large timber has been cut out could be protected and allowed to grow up, a valuable basis would be formed for a continuous supply. If to this were added some systematic scheme by the Government for planting on its waste lands, it is not yet too late to recuperate the pine timber forests of the country. To further the proposed undertaking, it would be well to import a few practical foresters, in order that their accrued wisdom in the old world might be utilized in the new. A portion of the revenue derived from the Crown Land dues by the Government would be profitably expended in fostering and protecting the timber interests on the public domain, and if they are not sufficient to meet the necessary demands, they should be increased. (Power for this purpose is given in the 1st section of an Act respecting Timber and Public Lands.)*

* Chap. 26, Con. Stat. of Canada, Sec. 1.

Under the direction of the Commissioner of Crown Lands, there is at present a system of wood ranging, which consists of a staff of twenty or thirty experienced and reliable rangers, engaged from December to the end of April, with some of the party continued to the end of October. The employment of these individuals has been very satisfactory, swelling the revenue in some instances 50 per cent., and in one agency 400 per cent. These rangers have standing instructions to report on any special waste, and amongst other things to see that any timber which has been killed by fire running through it, is utilized before the borer has destroyed the wood. Although their visits through the bush have been of great service to the Government, it is obviously impossible for this small staff of partially employed men, and that at a time of the year when fires of a serious nature never occur, to ascertain the origin of the destructive conflagrations which visit the pineries, or to look as sharply after the interests of the Government as is necessary. The writer would therefore respectfully suggest that the Government should appoint permanently the required number of wood rangers or inspectors, and that one or more constables be employed for every limit of 100 square miles, whose duty it should be to apprehend and report to the ranger, or other officer, any causes of violation of the Crown timber regulations, and especially with regard to fires, the officers in charge being authorized to examine under oath, and prosecute parties offending against the Land Act. At present the regulations are good; but as there is no one specially beside the rangers to enforce them, and as these are so few and spread over so large a territory, besides which they are not employed continuously, the Government therefore can hardly expect that careful supervision which the country has a right to demand for the revenue obtained.

With regard to the replanting of trees as a means of continuing the timber supply, the Commissioner of Crown Lands, writing in 1877, says that "It is, of course, known that on the continent of Europe, where forests are in the hands of the Government (as they are in Ontario), the cutting down of trees is rigidly regulated and restricted, a system of yearly planting being closely adhered to. The same practice is followed in Britain, where forests are chiefly in the hands of private individuals; but in those countries the population is at a maximum, and is maintained at that point. No entrenchments on the forest lands are deemed necessary, whereas in Ontario a vast yearly influx is continually pressing into the lands of the Crown, before which the forests must in the meantime yield, whatever steps may be deemed necessary to restore them in the future." The writer must dissent somewhat from the theory laid down, and would suggest that millions of acres of pine lands are practically unsuited for agriculture, and therefore worthless for settlement; and it is the manifest duty of the Government, as holding the land in trust for the people, to see that these tracts are protected in such a way that the young timber is allowed to take the place of that cut, and that they be guarded against bush fires and promiscuous pillage. With regard to the preservation and culture of pine timber, it is absolutely necessary, owing to the large area required for its growth, and the time it occupies in attaining a suitable size for the purposes for which it is used—say from 80 to 150 years, if produced from the cone—that the Government must be the producer, cultivator, and protector. No individual could acquire the thousands of square miles which would be needed; nor could any family or company afford, as an investment, to await the period when the greater revenue from large timber would be derived. But the greatest obstacle to a private scheme of this kind would be the danger of throwing so large a monopoly of timber and territory into private hands. The Government, by the retention of certain districts, and the appointment of competent foresters and constables, could guard, plant, and protect any-sized domain, and it is believed would be enabled to secure a paying revenue from the timber grown. It is therefore suggested:—1st. That pine timber lands should not be subject to entry and pre-emption or homestead laws. 2nd. That the lands now known as "Government pine timber lands," should be surveyed and appraised at their approximate value. 3rd. That experts be directed to ascertain—if it is not already known to the Government—the pine land area in Ontario.

With regard to the cost of producing timber, it is stated in the report on Swedish Forest Culture, that in the northerly part of Sweden it requires two and three hundred years for trees to attain their full size, whilst in the southern part of the country one hundred years was found sufficient. Estimating, therefore, our pine lands at one dollar

per acre, allowing one hundred and sixty years for the timber to grow, and interest at the rate of five per cent., which would double the principal every twenty years, the result would be that at the end of the time specified (160 years) the timber would cost \$256 per acre. The writer believes this statement to be a very inaccurate one. It does not take into consideration the further cost of fencing and the wages for supervision of the estate; whilst, on the other hand, the thinnings from time to time would pay a small percentage, probably enough to clear all charges for interest, etc. The lakes and streams enclosed might also be protected, and, together with the forests, could be made to yield a revenue from the fish and game produced in them.

In Sweden the pine and spruce lands are never entirely cleared; from six to seven seed trees are left on every quarter acre until the young plants begin to grow up. In five or six years these are removed.

With respect to the encouragement of tree-planting, the neighbouring Republic has given great attention to the subject, and has endeavoured to promote it by premiums, by reduction or remission of taxes, and on prairie lands the actual right to so many acres without any money payment, provided a certain number of trees are planted and cared for for so many years, and in various ways the State has tried to stimulate arboriculture, but the results have not been such as to warrant imitation on the part of Ontario. Practical papers on forestry, published in farming journals, and such others as chiefly circulate amongst the rural districts, to popularize the movement, and plantations made of our various native and selected foreign forest trees, on such Government properties as the Experimental Farm, Guelph, the Asylum enclosures, public school yards, such exhibition grounds where fairs are held (where tree protectors could also be shown), would go far to represent, in a practical way, how the general appearance of our country could be improved, adorned and beautified, at little cost. Trees for this purpose should be correctly and neatly labelled, giving age, the date of transplanting, as well as the common and botanical name of the specimen, and its native habitat if of foreign origin, etc. A few acres planted here and there would soon convince our farmers and others that there is money in the business, as well as beauty, besides an advanced price added to farm lands. With such facts before them, men would be found willing and ready to invest in this enterprise, and also to adorn their farms and home surroundings.

Mr. Hotchkiss, who compiled the lumber article for the last United States census, states that the lumber supply in Michigan is not over twenty-nine billions of feet, and that the ordinary quantity annually cut diminished the supply at the rate of six billions of feet per annum, which will use up these forests in eight years. The State of Wisconsin, he estimates, has forty-nine billions of feet of standing pine, and Minnesota six billions one hundred and fifty millions, but the supply is fast diminishing. He also estimates that at the present rate of cutting the Canadian supply will give out about the same time as that of the United States, say thirty or forty years hence, at the utmost limit; the lumber trade of the continent will then be transferred to the Pacific slope. One of the largest saw-millowners on the Ottawa informs the writer that he does not think there will be any pine to cut for exportation from Canada twenty years hence. Should this Province, therefore, wish to retain her timber interests, there should be no delay in dealing with the question in some practical way.

It may be stated, that there is a very strong feeling amongst the lumbermen and millowners on the Ottawa and elsewhere, that the Government should survey and inspect all the pine timber lands, and ascertain as far as possible what is worthless for cultivation, and absolutely exclude settlers and squatters from these tracts. In making such an examination the character of the soil should be carefully and thoroughly made known, as the surface of the ground is usually covered with a thin coating of good soil, owing to the decaying of the leaves from previous years, which will only raise one, two, or at the most three crops, thereby exhausting this thin skim of earth, so that nothing further will grow upon it. In the meantime the burning of the rubbish off this worthless plot has endangered, if it has done nothing more, millions worth of property.

Again, it is a difficult matter for parties holding license claims over a large territory to dispossess squatters, as these people, who have nothing to lose, and who are possessed of the means of making a fire, could revenge themselves to an alarming extent. It is

believed if the Ontario Government could make the people aware of the value of the pine timber, and the necessity there is for protecting it, they (the Government) would be largely sustained in passing and carrying out the most stringent laws for the exclusion of parties liable to injure their interests, or that of those who are making a living from the timber.

Having thus far dealt with our pine timber trade, which is of such vast importance to this Province, and the Dominion generally, owing to the large number of hands its production employs, the machinery and shipping utilized, and the enormous revenue derived from it, a little attention must be given to the hardwood trees, and those most suitable for forest planting. Perhaps it is as well to state that the area of the natural habitat of some of our most valuable native trees is very circumscribed, but experiments show that this may be greatly enlarged.

It may be said in a general way that no tree is unsuited for cultivation, but probably the largest returns may be derived from the fewest years by setting the Black Walnut (*Juglans Nigra*). This graceful and beautiful tree is an exceedingly rapid grower. Ten years from sowing the seed, on suitable soil, will give nuts in return; and at thirty years of age its wood may be sold for furniture purposes. Chief Johnston, of Brantford, states that he has trees of this variety in his grove for which he has been offered thirty dollars apiece. It will be found, by referring to the July number of the *Canadian Horticulturist*, a very practical lesson is taught by the experience of Mr. Horace Everett, who, it is stated, twenty-three years ago planted twenty-three acres of land in the Western States with black walnuts. The trees are now from sixteen to eighteen inches through, and were sold for \$27,000: this gives an income of \$50 per acre for the use of the land, with a minimum of labour, by planting this timber.

In all tree planting on level ground it will be found advantageous to set every second row with softwood trees, such as poplar, willow, basswood, black ash, etc., as these assist in keeping the ground clear of grass and weeds, and can be utilized in from five to ten years in a variety of ways. Their rate of growth being from three to four times greater than the hardwood trees, they present a special advantage for cultivation. The most profitable trees to grow will probably be determined by the locality where the planting is to take place—that is to say, when plantations are made of trees outside of the ordinary commercial timbers, such as pine, oak, black and grey walnut, etc. Near large paper mills it would be most profitable to plant basswood, and such of the poplars as are used in that business. If near extensive carriage and tool handle works, hickory and white-ash would be most suitable; near gunpowder factories, the willow, used for charcoal. Furniture makers use maple, birch, black and grey walnut, sweet chestnut; fish barrels, butter tinnets and hay rakes are chiefly made from black ash; and in this way scarcely a tree of any kind can be grown that is worthless, and as the land becomes denuded of its forests, every tree will have its special value.

It is believed that if farmers worked less land better, soil feeding their stock, and raised more trees, they would find more money in their land. Some idea of the capacity of soil for tree growing, under the management of experienced foresters in Europe, may be formed from the statement, that an acre of ash, elm, or sycamore, forty years old, will contain from 2,000 to 3,000 cubic feet of timber, and when sixty years old double that amount, after successive thinnings, which, near a convenient market, becomes an important source of revenue, and often realizes more than the cost of management and interest on the money invested. Larch, spruce, and other conifers, require less space than broad-leaved deciduous trees: larch will do well in good soil with only nine feet between the trees.

The quantity of timber grown on a given area in some of the European Government forests, managed in accordance with the rules of forestal science, is very much greater than the same soil would grow if the wood is left entirely to itself; so much is this the case, that Dr. Berenger, head of the Italian school of Vallambrosa, states in the *Journal of Forestal Economy*, 1871-72, that "while an uncultivated woodland taken for a long period, and counting interest and taxes, would yield almost nothing for the capital invested, it is well established that the same land, managed according to modern science, would in the long run yield a revenue both conspicuous and constant."

Whatever planting is done—and it is recommended that the nut-bearing trees should

be the first experimented with, such as sweet chestnut, walnuts (black and grey), hickory and white oak—the planting of nuts, or very small trees, should be made so as to cover the ground promptly, say three feet apart; these may be thinned and pruned as circumstances dictate. It is calculated that, with very little labour for culture, rough, rocky lands, or ravines, may, by planting and securely fencing—where there are no stock laws against cattle running at large—be made to pay a revenue in four years' time. The first cuttings could be utilized for hop poles, hurdles, grape sticks, walking sticks, or sold for re-planting on other waste lands, or along road sides or permanent fences.

Another estimate gives the price for the preparation and planting of ten acres of land with black walnut and white ash as follows:—Planting, harrowing, ploughing, etc., would cost \$5 per acre = \$50; seed, 50c. per acre = \$5; planting, \$25. Cultivating during first five years, if rows are eleven feet apart and three feet eight inches between the trees, to be thinned to eleven feet apart when required, will be paid for by crops grown between them. For cultivation from fifth to ninth year, with horses only, \$30 per annum = \$120. After this time no cultivation will be required, making a total of \$200 for ten acres. These trees, at 25 years of age, will average 16 inches in diameter at the butt, and about ten inches at the height of 16 feet. This would give—deducting waste in sawing—120 feet of lumber per tree. Allowing one-sixth for damage by the elements and loss from other causes, there would be, in round numbers, 360,000 feet of lumber, which, at \$50 per 1,000, would give \$18,000; whilst the tops for fuel would be equal to the cost of preparing the logs for the mill, and the expense of sawing would be \$5 per 1,000; so that, after deducting all outlay, the gross earnings would be \$16,000 for the use of ten acres for 25 years, and the interest on the amount expended for planting and cultivation.

The European larch is probably one of the safest trees to plant as an investment, and would thrive well on the sandy lands of Dorchester, or the gravelly plains of Burford. This tree grows rapidly and closely, and in 15 years becomes 50 feet high. It is equally at home on arid sands, rocky soils, ravines, or hill sides. It is valuable as an enduring tree, and for such purposes as railway ties, fence posts, etc., it has no equal.

In closing this paper, a reference to the planting of the larch by the Duke of Athol may not be out of place. These plantations were begun in 1728, and continued up to 1826, when more than 14,000,000 trees were planted, covering 10,000 acres. It was found that the larch gained its fullest value in 72 years, and before it reached this age the trees were thinned to 400 to the acre. Estimating the trees at 50 cubic feet worth a shilling per foot, the product would be £1,000 per acre from the poorest land for agricultural purposes that could possibly be found. Larch trees planted on this estate in 1743 were in 1795 nine feet three inches round at four feet from the ground, and 100 feet high. In 1870 these trees measured more than 16 feet round, and were 120 feet high.

From the foregoing observations, the following conclusions may be arrived at:—Firstly, it is absolutely necessary that forest fires should be suppressed, and that it is the duty of the Government, who derive so large a revenue from timber lands, to expend any sum in reason that may be necessary in the direction indicated. Secondly, it is undesirable to open for settlement much of the land at present covered by pine forests, as it is of such a rocky, barren nature as to be quite unsuited for agriculture. Thirdly, that rocky lands, ravines, and low-lying grounds may be profitably planted with little expense, if stock laws are enacted and enforced to keep cattle from destroying the young trees; fencing, where wood is scarce and dear, being almost a prohibition against the utilizing of waste lands. Fourthly, the area in which many of our valuable timber trees now grow, may, by judicious planting, be much enlarged; and finally, if the present destruction of trees is not arrested, or new plantations made, there is much danger that our climate, rainfall, and the general health and prosperity of the country, may be most seriously affected.

ESSAY ON FORESTRY AND ARBORICULTURE.

BY A. EBY, M.B., SEBRINGVILLE, ONT.

Highly commended by Agricultural and Arts Association.

It was lately asserted that in thirty years from the present time the natural forests of this continent would be exhausted, and that we shall be compelled to draw on Europe for our supplies of building material. It is probable that this assertion is a pessimist view of the resources of this continent, yet it is an undeniable fact that the destruction of our forests goes on far too rapidly for the future welfare of our people.

Until within a very recent period forests were considered an encumbrance rather than a source of wealth in most parts, not only of this Province, but of this continent. On account of its abundance, and the want of facilities for bringing it into the market, much valuable timber was destroyed, or at best burnt, for the sake of the potash it contained, within the lifetime of the present generation. It is but a few years since our timber has become valuable, and in the lifetime of many now living it will yet become precious.

Even should steps be at once taken for the restoration of our forests, our natural wood, and consequently our home supply of timber, will long be exhausted before we can hope to have a supply of our own growth. The time is not far distant when we shall have to draw our supply of building material from Europe instead of sending it there ourselves, as is now the case. The European nations, having long since turned their attention to forest culture, will have abundant supplies of valuable timbers when our own will be totally exhausted. While Europe is husbanding and restoring its supplies of timber, we on this continent are putting forth all our power to wipe all forests from the face of it. This is more especially the case in this Province, in which we have no mountain lands inaccessible to the plough. Though arid, sandy districts, too sterile for profitable cultivation, are not uncommon, yet, with few exceptions, they can all be tilled, and are consequently cleared and settled; whereas had we had mountainous ranges, unfit for cultivation, it is likely they would have remained unsettled in the hands of the Government, and could at once be utilized for growing forests, even if the natural timber had been removed.

It is well known that forests exercise an important influence on the climate. Forests retain moisture much longer than cleared lands, and it is well known that moisture in the soil attracts rain much quicker than parched lands. It has also been observed that thunder-showers are apt to follow streams and watercourses.

It is also a well-established fact that the more a country becomes cleared up and denuded of its forests, the more subject it becomes to long-continued droughts and violent storms. It is well known that districts of Europe once denuded of forest, but in which they have been restored, support a far larger population now than when denuded of trees. When the well-known Black Forest Mountains of Germany were derobed of their abundant growth of trees, it was found that streams arising in them, that were formerly navigable, gradually dwindled down to shallow brooks; whereas, since the restoration of the woods on those mountains, the streams have also again increased in size.

Spain at one time supported a population of thirty millions, but now that its mountains have been shorn of their forest coverings, it can barely support half that number.

It was well known that it never rained in Egypt. For centuries rain was unknown in that country, but since the Government has gone extensively into tree-growing, copious showers are by no means uncommon.

Mr. George P. Marsh says:—"There are parts of Asia Minor, of Northern Africa, of Greece, and even of Alpine Europe, where causes set in action by man have brought the face of the earth to a desolation as complete as that of the moon, and yet they are known to have been once covered with luxuriant woods, verdant pastures and fertile meadows; and a dense population formerly inhabited those now lonely districts."

"Hummel attributes the desolation of the Karst, the high plateau lying north of Trieste—until recently one of the most parched and barren districts of Europe—to the felling of its wood centuries ago to build the navies of Venice."—*Northrop*.

Dr. Piper, in *Trees of America*, says:—"Near my residence (Woburn, Massachusetts) there is a pond upon which mills have been standing since the early settlement of the

town. These have been in constant operation until within thirty years, when the supply of water began to fail. The pond owes its existence to a stream which has its source in the hills stretching some miles to the south. Within the time mentioned these hills, which were formerly clothed with a dense forest, have been stripped of trees, and, what was never heard of before, the stream itself has been entirely dry. Within the last ten years a new growth of wood has sprung up on the land formerly occupied by the old forest, and now the water runs through the year."

"Our summers are becoming dryer and our streams smaller. Take the Cuyahoga as an illustration. Fifty years ago barges loaded with goods went up and down that river. Now, in an ordinary stage of water, a canoe or skiff can hardly pass down the stream. And from the same cause—the destruction of our forests—other streams are drying up in summer."—*Wm. Cullen Bryant*.

Northrop says:—"Almost every work on forestry abounds in evidence that extensive forest denudation has everywhere diminished the flow of springs. The case of the famous springs in the Island of Ascension is often cited, which dried up when the adjacent mountain was cleared, but reappeared in a few years after the wood was replanted. Several lakes in Switzerland showed a depression of their level after a general devastation of forests."

Siemoni says: "In a rocky nook in the Tuscan Apennines there flowed a perennial stream from three adjacent springs. On the disappearance of the woods around and above the springs, the stream ceased, except in rainy weather, but when a new growth of wood again shaded the soil, the spring began to flow."

Marchand says: "The river that, from time immemorial, furnished ample water power for the factory at St. Ursanne, dwindled down so much when the surrounding woods were cut away that the factory was obliged to stop altogether."

Captain Campbell Walker, who was long employed in the forest service in India, says "He observed the drying up of springs and decrease of the *average* amount of water in some of the mountain forests of India, in which extensive clearing had taken place, and that such clearing had unquestionably lessened the *regular* supply for springs and permanent flow in the streams and rivers."

Foresters of note, like Captain Walker and Dr. J. C. Brown, claim that the recent famine in India was due to the extensive and reckless destruction of the forest of that country by the East India Company, thus lessening the supply of water from the springs, the former source of supply for artificial irrigation. The English Government is now actively engaged in restoring the forests on the mountains of that country.

Since the settlement of Utah by the Mormons, who engaged extensively in tree-planting, Salt Lake, instead of becoming shallower by evaporation year by year, as was the case before the settlement of that territory, has actually risen ten feet in the last twenty years, from the increased amount of water received through the streams supplying it. This increased size of the streams is said to be due rather to a decrease of evaporation, on account of the large groves now covering that country, than to an increase of the rainfall.

It is a well-known fact that many water-powers in the older-settled counties of this Province, that were considered valuable even thirty years ago, are, now that the country is fully cleared up, almost worthless, being available only for two or three months during the spring freshets.

It is not proved that the total rainfall of a country is lessened by denuding it of its forests, but in a well-wooded country there is a more general distribution of the deposition of moisture throughout the year. Observations in France have established that the rainfall in the forests is six per cent. more during the year than in the open country; that ten per cent. of the total rainfall in the forests is caught up by the leaves and reaches the earth but very gradually, if at all, and that the evaporation in the open fields is five times greater than in the forests.

That forests exercise an important influence on the climate and the permanent water supply, is the almost unanimous opinion of the foresters of Europe. This opinion is not only sustained by theory, but is in accordance with observations made in different countries and by different observers.

"These investigations show that the general destruction of forests has rendered the climate dryer, more changeable and trying, and that forests, on the one hand, tend to lower the general temperature of a country and promote the fall of rain at more *regular* intervals, and, on the other hand, they ward off *sudden* meteorological changes which result in heavy falls of rain and disastrous floods."—*Northrop*.

Mr. Marsh says: "One important conclusion, at least, is certain and undisputed, that within their own limits and near their borders forests maintain a more uniform degree of humidity in the atmosphere than is observed in the cleared grounds." Speaking of this continent, he says: "With the disappearance of the forests all is changed. At one season the earth parts with its warmth by radiation to an open sky, and at another receives heat from the unobstructed rays of the sun; hence the climate becomes excessive, and the soil is alternately parched by the fervour of summer and seared by the rigours of winter."

Commissioners appointed by several learned societies of Europe to investigate this subject reported that "Forests exercise a beneficial influence which can hardly be estimated too highly, in an increased humidity of the air, a reduction of the extremes of temperature, a diminution of evaporation, and a more *regular* distribution of the rainfall, while the injurious effects of their destruction is seen in an alternation of periods of droughts at one time with wasting floods at another."

Northrop says: "The forests serve as store-houses of moisture, both from their leafy canopy, which shuts out the sun, and the myriads or rather millions of leaves covering the soil and acting like a sponge, soaking up and retaining the rain and regulating its distribution, while the roots act as vertical drains, favouring infiltration and promoting the descent of the water into the lower strata of the earth, there to nourish the springs."

In our own country it has frequently been observed that seasons of long-continued droughts are much more common now than when it was first settled; but not only are droughts more common, but so also are violent storms. Twenty-five years ago the firing of a building by lightning was a rare occurrence, whereas of late years such losses are by no means uncommon; in fact, I have known several such losses to occur within a few miles of each other from the same storm in this county (Perth). In the neighbouring County of Waterloo such a thing as the firing of a building by lightning was almost unknown while the noble pine forests, so common there, remained intact, but since their destruction such disasters are as common there as in other counties.

Dr. Brown, the most voluminous writer on this subject in the English language, has clearly proven, from different official documents, that fearful inundations resulted from the clearing of the forests on the mountains of France. So great have been the losses from this source, that the Government has adopted vigorous measures for replanting the denuded mountains.

That such should be the case is quite natural. Forests not only retain moisture longer than the open country, and thus attract rain from passing clouds, but the trees act as conductors of electricity between the earth and the clouds or the air. The positive electricity of the clouds is constantly neutralized by a flow of negative electricity from the earth. The foliage of the trees act as so many distributing points, thus preventing, by gradual neutralization, those violent discharges with which we are so well acquainted. The safety to farm buildings from lightning, when surrounded by tall trees, should alone induce farmers to surround their premises with so beautiful yet effective lightning conductors.

From what is stated above, it must be abundantly evident that forests are a necessity to the agricultural interests and welfare of a country, not so much on account of the timber they produce as on account of their moderating influence on the climate. But while this is the case in all countries, it is especially the case in one so level as Southern Ontario. Most parts of this Province are still sufficiently wooded not to feel the worst effects of a treeless country, but the time is fast approaching when the reckless destruction of our forests will be deplored by our people. A country subject to the long and severe winters we have in Canada, needs the shelter afforded by trees against the blasts and storms with which we are all so well acquainted. The more a country becomes cleared

up, the worse will the wintry blasts become. Even the frightful blizzards of the Western States and Manitoba will reach us at no distant day if the wasteful destruction of the forests of this Province and of the adjoining States of Michigan and Wisconsin is permitted to go on unchecked for a few years longer.

Even now, fall wheat, the great staple of the Province, has in many sections become an uncertain crop, on account of the want of proper shelter during the winter and spring. The winds sweep uninterrupted over the fields, and drift the snow from them to the fences and roads, instead of leaving it as a covering to the tender plants. On the approach of sun in the spring, the thin covering of snow is melted off, and the plants lie exposed to alternate frosts and thaws. Thus, instead of a larger clearing giving a larger yield to the farmer, as he expects, his crops become more precarious and uncertain as his clearing increases. This, I believe, has been the experience of the great majority of those who settled on a bush farm. The great majority of our farmers would have larger returns from their farms if they had only three-fourths, instead of nine-tenths or the whole of it, cleared and under cultivation. The same labour put on a smaller acreage would bring a much larger return.

In order to spread a proper knowledge of so important a subject as Arboriculture, our Provincial Government should at once appoint a Professor of Forestry in the Ontario College of Agriculture at Guelph. Such a professor should deliver lectures on this important subject, and thus awaken our people from their lethargy to the importance of providing a supply of timber for future generations, and leaving them a wealth far greater than gold—a rich, beautiful, productive country, instead of a sterile, treeless, unproductive desert, as this Province will become if the present destruction of our forests, and the exhaustive and unscientific system of agriculture, now so extensively prevalent, is continued. It is highly necessary that a knowledge of a subject of so great importance to the agricultural interests of the country should be extensively spread while it is yet time to stop the rapid and often wasteful destruction of our forests. This object cannot be better attained than by the establishment of a Professorship of Forestry in our Provincial School of Agriculture, where the leading agriculturists of the future are receiving their training.

There are many tracts of land in all parts of the country totally unfit for cultivation—barren, sandy, or stony hills, or low, marshy, boggy flats, that would make splendid forests. Many of the former are too barren to produce even sheep pasture, while the latter are too wet to make it safe for cattle to venture into them. In fact, neither the one nor the other should ever have been cleared, but should have been retained as woodlands; as such they would have been valuable not only for their timber, but for the influence they would have had on the climate. Encouragement should be given to the holders of such lands to replant them with such forest trees as promise to be of most value for the future, or which may be especially adapted for the soil and climate. This could be done by exempting such lands from taxation, provided they are properly planted and attended as forest lands. But no land should be considered worthy of exemption on which cattle or sheep are allowed to pasture and destroy the young plants as they spring up. Nor should such woods be exempted from which the young and growing trees are cut, while only those that have reached their maturity, or stunted, ill-shaped young trees, are allowed to stand; such woods do not increase in value from year to year, as is the case where saplings and small trees are allowed to grow.

I have seen woodlands from which cattle were shut out, literally covered by young plants of one, two, or more years of growth, that had sprung up from the seeds fallen from the mature trees. This shows that our forests only need to be preserved in order to keep them growing; but most of our natural forests could be made more valuable by a little care and attention from an experienced forester.

The first care in preserving our natural forests is to protect them against the depredations of cattle; it is just as necessary to keep cattle out of a forest to be preserved as it is to keep them out of a grain-field. Cattle, if allowed to run in a forest, will cut off and destroy the young plants that are constantly springing up, and thus prevent the growth of new trees. No forest is worth preserving in which there are no young and growing trees. Forests must be replenished by young and growing trees, just as in the human family the place of the old and decayed is taken by the young and vigorous.

Fire is as dangerous to a forest at certain seasons of the year as to a building; a fire running through a forest may destroy in an hour the growth of half a century, or even a longer time. To prevent those bush fires, now unfortunately so common, we require, besides a more stringent law on the subject, a more enlightened public opinion as to the value of our forests—not only as sources of supply for timber, but, what is of greater importance, their moderating influence on the climate. The man that sets fire to a forest should be punished as severely as if he had set fire to a building; the latter can be restored in a short time by a little expense, whereas it takes years to restore a forest.

Old and decayed trees should be removed from a forest intended for preservation; so should all stunted and crippled trees, in order to make room for those that are young and growing. Care should also be taken that any vacant space is planted with young trees. In planting, consideration should always be taken of future demands. If a forest is intended only for fuel, such trees should be planted as will yield the most and best fuel, as the beech, maple, and oak; but as the future generation will probably need wood for other purposes than fuel, it will be wiser to plant such varieties as will yield valuable timber for other purposes, while the refuse wood can be used for fuel. This brings us to the question of the kind of trees to be planted.

At the head of the list of native trees for forest culture I would place the pine. It is peculiarly adapted for our climate; it is a hardy, vigorous grower, and satisfied with the lightest of soils. The different species of it grow either on the most arid, sandy soil, or on the moist, rich soil of our swamps. Pine requires somewhat more care in starting than some other trees do, but when they have once taken root they become hardy, and will thrive on almost any soil, except, perhaps, a heavy clay. Care should also be taken in planting to select the kind most suitable for the soil to be planted. The white pine found in our swamps will not grow so well on light, sandy soils as the yellow and red varieties do; but while it is not suited for uplands, it is the best kind for planting on the rich, muggy soils of the swamps that are to be found in all parts of the Province. For uplands and sandy soils, the red and yellow, and especially the Weymouth pine, will be found the best varieties.

For very light soils, there is probably no tree equal to the Scotch pine (*Pinus Silvestris*). Large numbers of this variety are planted on Cape Cod, and in other parts of the State of Massachusetts. While it will grow on almost any soil, this variety is especially adapted for the barren driftsands that are found in many places along our lakes. The seeds of it are easily obtainable from some reliable seedsman.

For general economical purposes there is probably no timber superior to pine. As a building material it has no superior. It is extensively used in the manufacture of cabinet ware and household furniture, as also in shipbuilding. Its rapid growth will make it a valuable timber to grow for railway ties, for which purpose large supplies will soon be required, as our natural forests are rapidly becoming exhausted, and in a very few years will be inadequate to supply the immense demands made on them by our railways.

There is another reason why the pine should be extensively planted. Its innumerable needle-shaped foliage act as so many points for the distribution of the negative electricity of the earth, and the neutralization of the positive electricity of the atmosphere and clouds, thus preventing their violent discharge in the form of a thunder storm. Of all trees, there are, perhaps, none so valuable in this respect as the pines and the firs, to which belongs the European larch (*Larix Communis*), presently to be described. The height to which they grow, and their pointed, needle-shaped foliage, make them especially valuable in this respect; and all isolated dwellings and outhouses would be much safer by being surrounded by a cordon of thrifty pines not to speak of the shelter they would afford against the cold blasts of our long winters, and their value in an æsthetic point of view. Fuller says: 'A belt of these surrounding a farm, or such portions as are occupied by the buildings, give a cheerful, comfortable appearance, and both man and beast will live longer and be more happy under such circumstances, than when exposed to every gale, and for six months of the twelve with nothing life-like to look upon.' He goes on to say: "If a man goes into the country to buy a farm, he will seldom call where he beautiful trees surrounding the house and outbuildings, for he knows instinctively

such places are not for sale, for the owner generally thinks more of his home than money; but it is the bleak, uninviting farms that are usually *for sale*."

Perhaps a more valuable tree for many purposes than even the pine, is the European larch, of which large forests are planted in Scotland and on the continent of Europe. It is also extensively planted in some of the Northern States of the neighbouring Republic. It is a native of Southern Europe, but will thrive in colder climates, even to the limit of perpetual snow. It is a tree very similar to our tamarack, but much more valuable. It grows very rapidly on almost any dry soil, but will not thrive in damp grounds, and cannot bear stagnant water. Its timber is used largely in shipbuilding, and is very valuable for piles and railway ties. For deals and planks it is inferior to pine, as it is very apt to warp. Fuller says: "It will last for ages when covered with water, or driven in wet ground. . . . Larch spiles have been taken up in Europe, where it is positively known that they were driven more than a thousand years ago, and yet they were sound and uninjured." Northrop says: "When raised under right conditions, it combines the two qualities of rapidity of growth and durability of wood more than any other tree. . . . Julius Caesar spoke strongly of its strength and durability." Monville says: "In Switzerland, the larch, as the most durable of woods, is preferred for shingles, fences, and vine props. These vine props remain fixed for years, and see crop after crop of vines bear their fruit and perish, without showing any symptoms of decay. Props of silver fir would not last more than ten years." Evelyn says: "It makes everlasting spouts and pent-houses, which need neither pitch nor painting to preserve them." "For out-door work it is the most durable of all descriptions of wood. I have known larch posts that have stood for nearly fifty years," says Michie; while Professor Sargent believes that "For posts it will equal in durability our red cedar, while in the power to hold nails it is greatly its superior." "The larch, while it holds iron as firmly as oak, unlike the latter does not corrode iron," says Northrop. It is said to have no equal for railway ties. Ties in use for sixteen years on the Boston and Albany Railway were found to be still sound. It has also been largely used for this purpose in England. Ten acres of larch, it is said, will yield as much ship timber as seventy-five acres of oak. Its bark can be used for tanning purposes, though probably not equal to oak bark or our hemlock. Containing a large amount of resinous substance, it makes good fuel, though it is not equal to our maple in this respect. As it grows very rapidly, it is much more valuable than oak for planting. Trees thirty years old are said to have been sold for \$15 a piece, while oak at that age were not worth over \$3. I have spoken thus freely of this tree, because from the description given of it, I believe it is one of the most, if not *the* most, valuable tree available for forest culture.

The most valuable of our native deciduous trees for cultivation are the ash, elm, hickory, oak, maple, birch, beech, basswood, butternut, black walnut, chestnut, willow, etc. Of these, white ash (*Fraxinus Americana*) is one of the most valuable. Its wood is highly valued by carriage-makers and the manufacturers of agricultural implements. It grows very rapidly, but prefers a moist, deep soil. As it is a very ornamental tree, forming a splendid head, it should become popular for wayside planting. It is also one of the best to grow for its timber. For low, wet soils, the black ash will be found preferable, though its wood is not very valuable except for basket-making. It will also make good flooring and fencing. Of the elms, the white elm (*Ulmus Americana*) is the most valuable. It is a rapid grower, and its timber is valuable for many manufacturing purposes where strength and durability are required. It grows to a very large size, and is a most beautiful tree. It is suitable not only for forest culture, but as an ornamental tree or for wayside planting. The elm prefers a deep, rich, moist soil. There are several varieties of the hickory that may be planted. The kind most suitable for the soil to be planted must be selected. They are rather slow growers, but yield valuable timber. By repeated transplanting when young, they form better roots than they do when growing in a natural state and will consequently grow more rapidly.

The oak is a very valuable tree, but a slow grower. It takes many years before it attains a size large enough to make it valuable. When planting it for its timber, I would advise planting it in alternate rows with some rapidly, growing tree, like the ash or the

elm, which will reach maturity long before the oak, and can be removed, and thus permit the latter to expand and grow to maturity.

The maple is a slow grower, but valuable for timber and for fuel. Some varieties, like the red or soft maple, grow more rapidly than the better-known sugar maple, but their wood is not nearly as valuable. The maples make very fine ornamental trees, and are consequently valuable for wayside planting. The sugar maple prefers a rich, loamy soil, while the red maple delights in low, moist situations, though it always grows on dry ground.

Though the beech is by no means a slow-growing tree, yet it takes many years before it attains a size to be of much value as fuel, for which purpose it is principally used. It is also to a slight extent used in manufacturing, especially for making planes and saw-handles. It is a fine tree, and grows in almost any dry soil. It should not be overlooked for wayside planting. Its nuts are highly prized for the young, especially in sections where the chestnut and the walnut are not to be found.

Basswood grows very rapidly, and is valuable for many manufacturing purposes, on account of its toughness and the ease with which it receives a high polish. As an ornamental tree it has few superiors. It is highly valued by apirians, as the honey extracted from its flowers is classed as equal to that made from white clover. For wayside growing, the linden should not be overlooked.

The butternut thrives best in moist, rich soils. It seldom grows very large, and though its timber is used by cabinet-makers, it would hardly be advisable to plant it for that purpose. But on account of its splendid nuts it deserves to be found on every farm or orchard.

The black walnut will grow rapidly on a good, rich soil. It is a larger tree than the butternut and is much more valuable for its timber, though its nuts are much inferior. Its wood is probably the most valuable that grows in our climate. It should find a place in all tree plantations in southern Ontario, and more especially along the shores of Lake Erie.

The chestnut requires a dry, sandy or gravelly soil, upon which it grows rapidly. It will thrive well in most parts of southern Ontario if it is planted in a suitable soil. This tree is valuable not only as a nut-bearing tree, but for its timber. Fuller says: "There are other kinds of timber which may be more durable than chestnut, but I know of none that is more rapidly and easily grown." He also says: "One crop of the nuts from a twenty-year-old tree will more than pay for the original cost of the land and planting them." While young the chestnut makes good rails, stakes, hop poles, etc., or it can be used for fuel. When the trees become large they make valuable timber for cabinet-work and house finishing. As an ornamental tree it always deserves attention, and is worthy of a place in even small gardens where a suitable soil can be found. When intended for forest plantation it should be sown rather thickly, and thinned out when the plants become from four to six inches in diameter.

Willow loves a rich, moist soil, but will grow on poorer soil if not too dry. It is a fine ornamental tree, but is not greatly valued for its timber in this country, though in England it is extensively grown for that purpose. As it bears beating better than any other wood, it is used for making cricket-bats, floats for paddle-wheels in steamers, brake-blocks for cars, shoe lasts, etc. It is also used for furniture making, planking vessels, etc. Mr. Sargent says: "As willow timber could be produced far more cheaply than that of any of our native trees, it should soon come into general use here for purposes requiring lightness, pliancy, elasticity and toughness—qualities which it possesses in an eminent degree, and for which more valuable woods are now employed."

For low, wet soils the white cedar (*Cupressus thyoides*) will be found most valuable. It grows rapidly, and is valuable for many purposes even while yet small. For swamps that it is desired to plant with trees, a mixture of pine, cedar, and black ash will be found desirable. The cedar can be cut for useful purposes long before it begins to crowd the pine.

In districts convenient to paper mills, the growing of poplars for wood-pulp will be found profitable. It is also in some places on the prairies grown for fuel, but is worth very little for that purpose.

Nearly all the forest trees can be grown with ease, if the proper time for seeding is observed. No special skill is required, nor do they demand any greater care than is devoted to ordinary farm crops. Nor yet is it a matter of expense. Fuller says he has grown many thousands, and that the expense, taking one kind with another, does not exceed two dollars per thousand, though the expense will vary, according to the price of the seeds. Nearly all forest trees can be readily grown from the seed. Except when but a small number is required, it will be found cheaper and more convenient to grow them at home. Where seeds cannot be collected at home, it is best to obtain them from some reliable seedsman. As a rule, the seeds of forest trees should be sown soon after they become ripe—this is the natural order—and many of the seeds are spoilt by keeping. It should also be remembered that many forest trees ripen their seeds in the spring or early summer, and that such should be sown at once after ripening.

Seeding.—The seeding may be done directly on the soil to be occupied by the trees, or in a nursery. For many kinds of trees direct seeding will be found the best, but the foresters of Europe prefer seeding the pine and the larch in nurseries, from which they are transplanted in the second and third years. By transplanting they are made to form better roots, and will consequently grow more rapidly after being started. Evergreens also require shading during the first year from the heat of the sun, and some protection against cold during the first winter. This can be more easily provided in a nursery than in an open field.

Drills.—The seeding should be done in drills. For most kinds a drill, or trench, about a foot wide and half an inch to an inch deep, is the best. The seeds should be sown pretty thickly over the trench, which is then levelled in even with the other ground. Where a cultivator is to be used in keeping down the weeds—which has to be done during the first two years at least—the drills should be at least four feet apart, but where the hoe or the spade only is to be used, the drills may be made much closer together. The smaller seeds should not be as thickly covered as the larger. In starting a nursery, care should be taken to have the soil well cultivated, and as free as possible from weeds; it should also be well manured, so as to give the young plants a good start. If the soil is heavy it should be well under-drained, so as to make it as loose and porous as possible.

When the trees have reached their second or third years they should be transplanted to their permanent locations. They should at first be planted three or four feet apart, in drills four feet apart. After a few years' growth the trees will require thinning out; a second and a third thinning out may be required before the trees have room enough for full development. When the seeding is done directly on the soil to be occupied by the trees, much the same course is pursued as when the seeding is done in a nursery, but attention must sooner be paid to the thinning out of the plants. Care must be taken to carefully weed the field or nursery, lest the growth of the young plants become stunted. In very dry seasons the seeds may require sprinkling to get them to sprout, but care should be taken not to drown them—in transplanting, the young trees may also require a little watering. In transplanting, care should be taken that the roots are not long exposed to the sun or cold winds. If possible, a damp, cloudy day should be taken for transplanting, which should be done early in the spring. When trees are to be taken some distance before replanting, care should be taken not to let the roots become dry. Most deciduous trees can be taken up in the fall, and the roots pruned, tied in bundles, and then well covered until the spring, when they will be ready for transshipment so soon as the season is far enough advanced for planting.

While on this subject, I cannot pass without speaking of a branch of arboriculture which, though not strictly forestry, is so closely allied to it that it deserves more than a passing notice—I refer to the planting of trees along the roadsides. By a little trouble both sides of our public roads could be planted with some kind of forest trees, valuable for their timber. By planting them twenty-five feet apart it would require 420 trees for each mile, to plant both sides of the road—equal to several acres of closely planted forest. This would add immensely to the beauty of our country, and would have an important influence on our climate, not to speak of the comfort it would be to travellers on a hot summer day, as also to the cattle grazing in the adjoining fields, or the shelter such trees would afford in a storm.

For this purpose such varieties of trees should be selected as not only grow rapidly, but produce valuable timber when grown up. For this purpose pine, larch, oak, elm, ash, basswood, maple, beech, walnut, chestnut, etc., according to the nature of the soil to be planted and the climate, should be selected. The planting should be done by the owner of the adjoining land, whose property the trees should be. The planting of the trees might be done under the superintendency of the pathmasters, under whose care and inspection they should also be placed. He should not only superintend the planting, but the removal of mature trees, and the replanting of the space occupied by the removed trees. For this purpose it would be necessary for the Legislature to pass an Act relating to this matter. I think it would not be a very difficult task to form a generally acceptable Act on this subject. Much has already been done in some sections in the way of planting trees along the roads, but to make it at all general will require an Act making it compulsory, and appointing inspectors or overseers, under whose superintendence the work should be done. The immensely favourable influence such general tree-planting along our roads and highways would have on the climate would justify the Legislature in passing an Act of the kind, and I hope some one of our many members will find time enough to draw out a Bill of so general a benefit.

The Government should have a careful survey made of the extensive territory still in its possession, and set aside all parts not suitable for agricultural settlement as forest lands, and put them in charge of thoroughly competent inspectors, whose duty it would be to preserve as much as possible the existing growing timber, and replant such tracts from which the timber has been removed. In that way large tracts that are practically worthless for agricultural purposes would become a source of no small revenue to the Province by the time the next generation will have to grapple with the important question of ways and means. By timely action in this matter large forests of valuable timber might be prepared for future generations, who will not be able to draw their supplies from our natural forests, which will be exhausted long before such new growths would be fit for use. By replanting such otherwise worthless lands with valuable trees, and putting them in charge of thoroughly trained foresters, they would in a few generations become more valuable than agricultural lands, and prove a far greater source of wealth to the country than if allowed to become private property or permitted to remain barren wastes, destitute of valuable timber and unfit for cultivation.

Finally, I would recommend the formation of a society that would devote itself to the spreading of a knowledge of arboriculture and forestry, and the collection of information as the state of our natural forests, the kinds of trees most suitable for the different sections of the Province, and the encouragement of tree planting. Such a society should prove a great benefit to the Province. It should meet at least once a year, either during the time of holding the Provincial Exhibition, or at some other convenient time and place.

ESSAY ON FORESTRY, IN ITS CLIMATIC AND HYGIENIC INFLUENCE.

BY M. McQUADE, EGMONDVILLE.

REMARKS.—If the following rough sketch shall be the means of adding one acre to our forest area, shall add fertility to one acre of land, shall be the means of adding to the beauty of our landscape, the comfort of one family, the grateful feelings of one true Canadian, the efforts of the writer will be amply rewarded.

How rapidly our world moves and circumstances with it! Seems but yesterday since he who would think of saving timber in Ontario would be considered a madman. It is only forty years since this part of our peninsula was almost an unbroken dense and mag-

nificent forest, when the sole aim of the pioneer was how most readily to get the timber burned, destroyed, or put out of the way in any fashion most speedily. Such a desire was commendable under the circumstances; but the practice has been carried too far by all and to a ruinous extreme by some—partly through ignorance, partly through a mistaken desire for gain, by which they bartered the few remaining trees for a few cents. The plea set up by this class of people is that an acre of grass or grain is worth more than the timber. This would be very good thirty years ago when clearings were small, but when the timber belts are getting so thin that they are scarcely sufficient to break the breeze or arrest the snowdrift, when the owner of these wantonly sacrifices his few remaining trees because cordwood is three dollars a cord, such a one is not only inflicting an irreparable loss, not only on himself but on the whole community. A custom prevailed, at least in this vicinity, of cutting down every tree and twig not only along roadsides and boundaries, leaving the country treeless and marked only by dead line fences. Such conduct is wrong and can be corrected by planting rapid growing trees on roadsides and boundaries, and the sooner the better for all concerned. Want of knowledge of nature's laws is the cause of such a state of things. Our ordinary farmers never imagine that a few trees scattered through their fields can have any effect on their grain crops other than as so many obstacles in the way of the plough, the reaper, and the horse-rake; and the boy who drives these declares that they should be cut down. We all know that it is very convenient to have a piece of timber to furnish our winter's fuel, to make a few fence rails and the like; but how few ever think that those trees are not only nature's ornaments, but the farmer's best friend in tempering either a hot or cold climate, in producing copious dews, frequent showers, increasing snow falls, not to speak of their grateful shade, friendly shelter, and mercantile value. How many of our people think of these? How many can believe the natural fact that when our timber belts shall have been cut or blown down, the farmers of Ontario can no more grow fall wheat than they can in Minnesota or Dakota; that showers in summer will be rare and uncertain; that those terrific storms which cause such destruction in prairie districts will sweep our Province with merciless fury; that our overflowing springs will diminish and dry up; that where water can now be got at fifteen and twenty feet, none will then exist; that our rivers will dwindle down to a few solitary stagnant shallow pools; and that the crystal brook in which the speckled trout was wont to leap and gamble, in days gone by, now presents only a crooked line of dry gravel from June till January? In those days of universal tillage the grass will burn off the earth, the cattle perish for want of water—and why? Because we have not the everlasting snow-capped mountains hanging over us to feed our creeks and springs, because we have destroyed our forest trees which nature's Great Architect planted for that purpose. Do our people know all this? Will they believe it when told? O! that some mighty genius with the tongue of Demosthenes, eloquence of Cicero, and pen of Homer, would proclaim it in every hamlet throughout the length and breadth of our fine young Province before it is too late! Will not the press of our country announce in thunder tones the dire fate that awaits this garden spot of America, if the remnant of our once magnificent forests is not spared and saved from utter destruction!

Someone may say that we have been trying to manufacture an agricultural fright, that we are courting an imaginary evil. Would that we were wrong, or that nature's laws could be reversed. Such is not the case, however; they are all stubborn facts, and in painting them we have not used the darkest colours, nor even the deepest shade which our brush would give in the hand of a master. We shall try, in a simple and familiar way, to prove what we have advanced from a farmer's view of the case, with a few facts from science as corroborative evidence, and we must remember that when nature speaks she means it, and science applied is nature's voice modified.

Everyone will admit that a fertile soil is the most desirable feature in a farming country, but a soil to be fertile and retain its fertility must be irrigated from the clouds, either as snow or rain. It is also a melancholy fact, too patent to many on some of the prairie sections of Western Kansas, that a soil however fertile is useless without rain, and what is true there is true here. Take our richest land and sow it with any crop and let not a shower fall on it from January till November, what will be the result? Failure. Rain must be had to grow a crop on any land away from the sea shore; frequent showers

mean good returns in a warm climate. To insure these, there must be a source of supply and means of distribution. There must be a wet surface from which the rain cloud can be formed; there must be a medium to attract and condense that cloud, else it will constantly float in mid-air and never descend. We must remember that rain and dew clouds are produced by evaporation from the wet surfaces on the earth, just as steam rises from a boiling kettle. Now, it is easy to understand that if the kettle is dry there will be no steam. In the same way, when our water supply runs short, our dew and rain clouds will be deficient. What is the experience of the old settlers on this point? Will they say that our water supply is now what it was forty, thirty, twenty, or ten years ago? Let the facts speak. Thirty years ago the brook which runs through Egmondville furnished water to turn a great undershot wooden bucket wheel, about eight feet wide and ten feet in diameter, to drive two run of stone; also sufficient to drive a saw mill. The saw mill ran during about six months and the grist mill had water to run through the whole year, except perhaps a week or so in September, when a full head could not be got. Imagine the volume of a stream eight feet wide and two feet deep at a rapid current for twelve months. A few years later water began to shrink, when the old bucket wheel was replaced by a centre discharge and the saw mill was put on short time. Ten years later the grist mill had to rest in September by reason of low water. It after this passed into other hands and an improved turbine took the place of the centre discharge, but even with this great economizer of water power, steam had to be introduced, and this magnificent stream has to-day, and since the middle of June, not sufficient water to wet its bed, except in a few places where some bush land is on both sides, a few small pools of green, stagnant water may be found. Twenty years ago the lover of sport could catch trout, bass, chub, and suckers, at any time in summer, from Bayfield to Dublin, or shoot the grey or wood duck; to-day there is not sufficient water in its whole length to keep a decent family of frogs in drink. This instance is the history of all similar streams in our country. Twenty years ago there were swamps and patches of low land, where water could be got for cattle, if not on the surface, at most at the depth of a foot or so during the driest part of the summer; now, twenty to forty feet is the water level and, at the time of writing (the 16th August), complaints are numerous that wells of twenty feet and over, sources which did not fail in the past thirty years, are dry. What a change—gradual, sure and great; leaving cattle and owners without a drop to wet their tongues. Since every effect has a cause, we must have one for this great change. Will any one say that the days are getting longer, the sun hotter, the earth going nearer the source of heat? Certainly not. Then what great physical cause has brought about this physical result, for the cause is here and is local? What local change has taken place over the face of our county in forty years and has continued up to the present time? What is the comparative area of tillage and timber land now and thirty years ago? He who will answer this question exactly will show the cause why wells and streams are dry at present. He who, on this data, with the present rate of destruction of our woods, would institute an exact mathematical calculation, could determine how long it would be till farming and stock raising must cease in this part of Ontario; how many years it would take to cut off our water supply entirely during the summer months, except what might be accidentally be got from some stray tornado or violent snow storm in winter. We may venture a rough estimate at present. We now know the cause, and, since it is local, shall not take in the whole county, but use the two adjoining townships for comparison. Forty years ago the proportion of woods to cleared land was about as 98 to 2; thirty years ago, as 80 to 20; twenty years, as 70 to 30; ten years since, as 60 to 40; to-day, as 15 to 85. Our water supply has dwindled down from 60 to 15 inches, or 400 per cent. in ten years. We hope to be able to prove that it must always, in an inland country like ours, keep in exact proportion with the area of timber growing in the country immediately around.

HOW GROWING TIMBER ATTRACTS MOISTURE FROM AIR AND PRODUCES WATER.

To understand how timber land acts in condensing moisture from air, we must have some idea of the agencies at work in the structure of it and the effects of these agents on external air; in other words, we must have some knowledge of how trees grow. This we

shall try to sketch in a few simple words. The tree, like every other vegetable, is made up of two kinds of substances, one called mineral elements and the other called vegetable, or organic elements. The first set of elements is composed of the alkalies, potash, soda, with flint and rust, or what chemists call oxide of the metals, iron, magnesium, manganese, calcium, together with sulphur, phosphorus, and traces of other minerals sometimes. These substances it gets from the subsoil, and when we burn a piece of timber in the open air, they will be found in the ashes. Now, if we examine the little mouths of the roots, or the sap vessels of the new wood, we will easily conclude that pieces of iron rust, little grains of manganese, pieces of limestone, little bits of bone dust, or granules of flint, could never get through them alone, although all these are formed in the ashes, and therefore formed part of the wood. They entered the extremities of the radicals in a decomposed form and in a perfectly thin solution. The air enters the soil, seizes the mineral compounds, decomposes them, reduces them to their simple elements; the water of the soil and the subsoil takes up the newly-born substances, some as gases, others fine atoms; the little spongy roots suck up the water, which is now the sap that courses through the newer wood; it reaches the leaf, where the air again acts upon those mineral elements and prepares them to form part of the vegetable structure by being deposited in the rind, or where the next coating of new wood is to be formed. The water which carried them to the leaf, having performed its mission, is poured out on the air as vapour. Herein lies the benefit. Who has had on a wet garment thoroughly wet through to the skin and allowed it to dry on his back and felt warm all the while. Even in the warmest day in summer will not a wet shirt produce cold? Everyone knows how much heat is required to boil water in the open air. It is just so at the surface of the leaves; every drop of that water which was thrown off is changed into steam and the operation sends a volume of cold, or, philosophically speaking, destroys or absorbs a volume of heat in the air, and the result is the condensation of the vapour of the air into rain clouds which, when of sufficient density, comes down in showers. Where vegetation flourishes, the air is always humid and only needs cold to bring it down in dew, rain or snow. To illustrate this, let anyone fill a jug or glass pitcher with cold water, wipe the outside perfectly dry and set it in a close, warm room, when, in a few minutes, it will be covered with dew; and if the room has been quite warm and the water below forty degrees, the drops will assume quite a considerable size and run down to the table. This is a miniature example of what is going on above the tops of our forest trees. But we saw that the trees drew a large supply of water from low down in the subsoil; they also condense much of what is constantly flowing round them in air and suck it in through the lower layer of veins in the leaf; strain the carbon, ammonia, and other vegetable foods from it; then send it out again through the upper layer as vapour, still adding to the cooling process. This accounts for the refreshing coolness experienced under the shade of growing trees, and the greater the heat of the weather, the more rapidly will evaporation go on and the more cooling the shade. Hence, no shade artificially constructed can equal nature's living canopy so beautifully designed and wisely constructed that they not only neutralize the fierce rays of the sun, drink up poisonous and noxious vapours, but pour out a plentiful flood of oxygen to vivify man and beast under the debilitating and lethargic influence of continuous hot seasons. This is called ozone, and is composed of two measures of oxygen gas in chemical union. So wonderful is its effects supposed to be, that it was made a specific by quacks and itinerant medicine men; yet, beneath the shady arbour, or in the open forest nature showers this precious medicine around our heads. Although not strictly relating to forest growth, yet a product of it, a hint of its source may not be uninteresting here. All the mineral elements which are carried from the subsoil are united to oxygen in their natural state, but since the tree does not need this oxygen, it is set free in the leaf; the carbon of the soil, as well as the carbon of the air, which the tree must have, are both got through union with this same oxygen gas. Here, then, is a double supply of oxygen to spare, and a chemical union takes place, forming the double oxygen compound, ozone. Not having an authority by me, I cannot give its specific gravity, but conclude that it must be much heavier than air and, therefore, falls rapidly towards the earth. From these facts it is clear that no shade for man or beast is equal to green spreading foliage. Cattle especially should have plenty of such shade, and milk-

ing should be done under the shade of trees with green grass under foot if we would secure pure sweet milk free from unhealthy odours.

HOW MUCH WATER IS YIELDED BY AN ACRE OF WOODS?

Since we know with certainty that on growing timber we must depend for our supply of water, a very natural question is, How much water will an acre of our forest supply during the season of growth? This question can be answered with only approximate certainty, as it will depend on the leaf surface, the age, vigour and kind of tree, as well as the length of the day in summer, the duration of the growing season, and the heat and light to which it is exposed, together with its situation in a moist or dry atmosphere, as well as the general rate of motion of the air during the season. In order to solve this question Professor Williams, of Rutland, Vermont, instituted an experiment in 1789. The tree selected was the hard maple. Two leaves and a bud of a branch were sealed in a bottle while yet attached to the tree. The expired water collected and weighed was found to amount to 16 grains in six hours. The tree was $8\frac{1}{2}$ inches in diameter, and thirty feet high. It was cut down, the leaves carefully counted were in number 21,192. Supposing all these to have evaporated like those in the bottle, they would have expired, in twelve hours, 339,072 grains of water. A very moderate estimate, and below the usual quantity of wood per acre of similar land, gave four such trees to a rod, or 640 per acre. At 7,000 grains to a pint, 3,875 gallons, or 31,000 pounds, of water were evaporated from an acre of woodland in twelve hours. On the 26th of May the maple leaves were one-sixth of their full size, and on the 15th September following these leaves began to turn white. By throwing the fifteen days in September and the four days in May out of the calculation, the leaves may be considered fully developed for the three months. During these ninety-two days the evaporation would have amounted, at twelve hours a day, to 2,852,000 pounds. The rain at that place during that period was $8\frac{3}{10}\frac{3}{10}$ inches, or $43\frac{1}{10}$ pounds, to every square foot of surface, equal per acre of 43,560 feet, to 1,890,504 pounds. From this it is clear that the amount of water by evaporation from an acre of woodland exceeded the quantity of rain-fall during the same period by nearly 1,000,000 pounds of water to the same area, and, if the calculation had taken in fifteen hours to the day in July and August, as expiration goes on rapidly when the sun shines, the quantity would have been much larger.

Such experiments are of vast importance in determining the proportionate quantity of timber to cleared land, in order to secure a sufficiency of rain-fall during summer. But this one, though valuable in proving one of nature's laws, is not of any definite practical importance as a means of guiding us in Ontario, since our location is different with regard to many important essentials, such as soil, proximity to ocean, elevation above sea level, and relative timber and cultivated surface; but such an experiment, carefully conducted, in any particular locality, and careful estimates based upon it, should be able to estimate pretty correctly what area of leaf surface would be required to insure a full crop under ordinary circumstances.

THERMAL INFLUENCE OF TREES.

In the former paragraph we considered the use of timber in the collection and condensation of water, and shall now try to show their influence in modifying the heat and cold of the climate. It is one of nature's laws that *when a body passes from a rarer to a denser state, heat is liberated, and from a denser to a rarer, heat is absorbed*. Now, the sun's heat is a very powerful agent in the growth of plants, so much so that without it no vegetable can come to maturity, but experience proves that too much heat will destroy vegetation. Newspapers report that crops have been burned off the ground in several parts of the Western States during the present season. We have had similar experience in Huron County some five years ago, when a hot wave, of some two days' duration, passed over us, at the time when fall wheat was getting in the milky state; the result was that there was no grain formed. In a rich field which had been summer-fallowed from an old common at Exeter, and was some twenty acres in extent, with a crop of straw that should ensure forty bushels to the acre, there was not one grain of wheat. Others,

from fifteen acres, got from forty to fifty bushels of chicken feed, while others, who happened to have it on strong clay land, and with timber land on the west side, got somewhat over half a crop. (Our prevailing winds in summer blow from west or southwest). The question is, How did the woods to the windward save the grain? was it by its shelter or by its evaporation? By both. First, a hot wind moving rapidly will heat and dry more than a slow one, or a calm of the same temperature. Second, the chemical action going on at the surface of the tree tops takes the fierceness out of the sun's rays, which afterwards reach the ground through a stratum of vapour, and on that account the crop was not completely destroyed.

If this paper were intended for scientific rather than agricultural information, we could show how much heat is converted into motion, and therefore rendered insensible by a given quantity of water at, say sixty degrees, passing into vapour and then into its gases; but since the calculation would not be very interesting to farmers, we shall take a familiar illustration. To change water into steam at the least requires 212 degrees; but this is not all. You may confine that steam, and add other equal quantity of heat, and the thermometer will indicate no higher temperature. The only difference between steam at the boiling point and steam which has taken double the quantity of heat, is, that that which has absorbed the most heat will have the greatest motion among its particles. We see then that the power of water to neutralize heat is very great, and will increase as the heat is intensified. But we must go a step farther in this direction, and show that the leaves of vegetables are natural laboratories in which, through the agency of heat, an intense degree of cold is generated. Part of the water which flows as sap, by the natural forces, at the surface of the leaf, is decomposed and changed into its elements—oxygen and hydrogen. We have seen that water passing into vapour may neutralize 450 up to perhaps twice that quantity of heat; but when we come to consider its still change to its gases, a very much greater effect will be produced.

If we wish to decompose water by means of heat we must first bring it to steam, then throw that steam against some body that is as hot as iron at a red heat, when the water will pass into its elements. (This is the cause of steam boiler explosions.) From these facts we may easily comprehend the wonderful influence of growing timber in the reduction of temperature during our hot spells in summer, when our crops are liable to be roasted before they come to maturity, and pastures are burned brown.

Let us now take a look back, and see how these facts square with our experience from thirty years ago down to 1881. At that time, when little land was cleared, when such a thing as prevailing wind was unknown, when the sun's rays struck directly down on the little clearings and were reflected from the walls of timber both morning and evening, when one would suppose that by the addition of reflected heat the crops should be in more danger—what was the result? Were there any sunstrokes, did our crops wilt prematurely, or pastures get parched? Never. It is true that we then had rather unfriendly showers in haying and harvest; that he who wrought hard, watched the weather signs, and was not afraid to haul in hay or grain all night, would have good flour and fat cattle; but he who took his ease, stuck to the ten or twelve hour system, would have spoiled clover, and see his cakes run out of the pan. Short or parched pastures were unknown in those days. Cattle which could be brought through alive to the first of May would be fit for the butcher on the first of November. Even the after-grass on stubble-fields was so rank as to interfere with fall ploughing. Contrast then and now. Bare, square, open pasture fields, with the colour of the soil shining through, as if fire had passed over them, leaving the stubble of grass as brown points, and the roots like dry stubble. Nothing green, except, perhaps, a few omnipresent perennial thistles; cattle panting with heat, or going in a trot to watering trough; while some unfortunate, ignorant of the thermal influence, or driven by necessity to dangerous exposure, falls a victim to the sun's rays. The verdict charges the calamity to the sun, and some extra religious body may go so far as to charge the Maker of the sun with the damage, when in reality it or He had nothing to do in the matter. The paying price of cordwood, the great demand for salt and flour barrel staves, the wasteful conduct of the farmer and lumberman must shoulder the blame. The time is very near at hand when we shall not be able to find a single tree fit to make a stave in our district—when all the elms over twelve

inches in diameter will have vanished from the land. Then, why not spare before all is spent? Save at least the remains of our original forest elms which have not attained maturity; do not cut down a young, healthy, vigorous-growing tree, unless you have more timber than clearing—unless you are prepared to see your grain and grass shortened beyond the point of profitable cultivation.

THE EFFECTS OF GROWING TIMBER IN MODERATING COLD.

Like the raw recruit who blew his fingers to warm them and his soup to cool it, nature uses water as a check to the extremes of cold as well as heat, and has placed a beneficent law which, under proper management, will soften down both ends of the scale. Water increases in density from its elements down to forty degrees, where further density stops, and from that point it will begin to lose density and be changed into snow or ice. Here we have to begin at the other end of the process, and use the agent that destroyed or stored up heat to give it out again, confirming the philosophic axiom, that nothing can be lost in the world. As we saw before, that when a body passes from a denser to a rarer state cold is produced, so, when it passes from a rarer to a denser, the heat is once more given off. When the sun's rays strike the surface at a small angle, and the mercury drops down to thirty at nights, the vapour in the atmosphere condenses to water, and is further converted into snow or hail. That heat which was used in vapourising the water is again thrown out on the air, to warm the breeze and make northern latitudes habitable.

TREES AS SHELTER AND FENCE POSTS.

It will be only a tedious repetition to go further into the climatic influence of woods, and we shall now consider its uses as shelter to fields, and the necessity of keeping our fields covered with snow, if possible, during winter. Where our wheat and grass lands can be kept covered during the winter season—which will prevent the surface from freezing and thawing—good results are sure to be obtained: while if left bare the ground will freeze, and by its expansive force break the roots of grain or pull up clover. When a thaw follows the surface shrinks, and sometimes runs, leaving the surface roots exposed, which are dried out and killed by the sun's rays and dry winds—a practical experience of which we had last spring, when the surface roots of the wheat were so dried up that all the side shoots died out, and only about one or two of the centre stalks in each bunch came to maturity. Such a state of things is new with us, which only proves that we must be prepared for new and costly experience unless we can, in some way, replace the timber that has been taken away.

The kinds of timber to plant can easily be learned by every one, for each soil and climate has some variety peculiar to itself—some sort that would do on one soil and would fail on others. The evergreens, pine and spruce family, are best suited as wind-breakers, and some, among which may be mentioned the European larch, very valuable for the durability of its wood. Our own and Norway spruces grow well when properly started. The tamarack grows fast on any soil, but has the disadvantage of shedding the leaf in autumn, and its timber is not durable, besides it is liable to be attacked by borers and killed early. The Austrian pine succeeds very well in heavy or light soil, but, except for variety, must give place to the spruce family. Anyone desirous of planting should consult an experienced nurseryman, who will not only furnish him with the proper stock, but the information concerning his soil and modes of planting. One thing must be borne in mind, that the cone-bearing, or resinous trees, must be planted by themselves, for when mixed with those that shed the leaf, such as the hardwoods or even poplars, neither will succeed. Our own forest timbers, those which grow naturally on the soil, should be preferred for general planting, and may be so placed as to be used both as shelter and fence posts. By selecting some of our rapid-growing kinds—such as hard maple for high land, soft maple, black ash, and soft elm for low, heavy land—and planting in close triple rows along boundaries, or dividing fences in such a way that the middle row might, after it had grown sufficiently large, be used to fasten fence wires to, thus securing the double purpose of shade, shelter, and fence. On that side of the farm most exposed to storms it would be advisable to plant the coniferous kinds, which would not only tend to the beauty

of the landscape, but protection from storms, and would more effectually secure a covering of snow to the adjoining fields. Unless in cases where there may be a plot of poor land, unprofitable of cultivation, we know of no better place to plant than around fences.

Planting.—"Where there is a will there is a way" is as true in this as in any operation; and anyone who is in earnest will find not only the plants but information and time to put them down. Since failure or success in the first attempt will exercise considerable influence in after operations, it is desirable that ardour should not be damped in such beneficial operations, but that all the elements to secure success be present from the commencement.

In our short hurried seasons time is a great deal to the farmer, and the labour of planting should not interfere with seeding. Although it will be both cheaper and better to get spruces, larches, and the like, from the nursery; the hardwoods can be got in abundance almost anywhere that old timber has been extensively cut and left commons. There are places in this vicinity where hard and soft maple and all the kindred timber plants can be got of any age, growing in the sunlight, and standing often so thick that a person cannot get between them, from half an inch to an inch through, and from seven to nine feet high, healthy, vigorous and straight. For those who have not much seeding or other work in early spring, the supply can be got in spring and immediately set out; but where it is desirable to set out many at a time, the better plan will be to take a sharp axe and spade and dig up the required number just as the snow is beginning to fall, shake the clay from the roots and dip the root into a puddle of clay, made to the consistence of thick cream, pile them in your hay rack and haul home. Next, select a place in some of your fields where snow will not drift very high, but away from fences, for fear of mice, and plough three furrows, throwing one twice over; lay the trees close in a row with roots against last furrow thrown out; hitch one horse to your plough and throw one furrow back on the roots; then put on your other horse and throw up two deep furrows, level the clay in over the collar and part of the stalk with the shovel, and the fall work is done. The object of the deep furrow is for drainage, and should run with the watershed of the ground. We would also plant with the plough, and if possible, summer-fallow the ground. Before setting down in spring, all bruised roots should be cut off smooth with a sharp knife and the head shortened in to correspond with the reduced roots, then dip once more in clay puddle, plant while the ground is in good order, shake the tree to get the fine mould well among the roots, set a little deeper than it stood in the woods, stamp well down, seed with clover, and mulch heavily with sawdust or short straw around each tree and leave the rest to providence. It will be prudent to bring about two plants to the hundred more than you have spaces for, which can be set in a corner to fill a vacancy in case of accident.

THE PRESERVATION OF OUR ORIGINAL FOREST.

On this topic very little need be said. Like a fish out of water, the few patches of original forest have had their surroundings changed by being exposed to rapid currents of air to which they were not accustomed at birth, or during growth, and therefore their means of feeding has been entirely changed. The result is that those that have advanced towards maturity and attained high heads are dying of starvation, while trees of later growth with low heads drink up all the carbon of the air which circulates among their branches, and leaves the light barren air to rise in mockery around the heads of their hoary parents.

The cause of decay of high-headed trees may be explained in this way: Trees derive nearly all their vegetable food from air. The coat of leaves which annually falls undergoes fermentation. In this process, carbon, which forms the more bulky part of wood, is, by the action of oxygen, converted into carbonic acid gas, which is once and a half as heavy as air. This gas, in forest in its pristine state, rose slowly in the calm of the woods till it came within reach of the high-headed trees, where, in the sunlight, they drank it in and flourished. Since plants feed plentifully only in sunlight, the younger trees that were lower and consequently in the shade of the older ones, were enabled to

take only a very small portion of this vegetable food. On account of their unfavourable stature they struggled with all their strength to get their heads up in the light. In an unbroken forest a breeze is impossible, and the gases rise calmly and slowly to the top of the tallest trees, but the moment that forest becomes reduced to a clump or thin belt, a continual breeze sweeps through, the vegetable gases are hurried along at a low level, and never, in any considerable quantity, reach the high-headed trees. The result is that they are robbed by their more humble and younger neighbours; they soon die at the top, and, unless they can push a few branches lower down, cannot long survive.

The only plan at present apparent is to cut down all timber that shows any symptoms of decay at the top; plant three young trees where one was cut down; fence woodland so that cattle cannot get through it till a new growth of seedling wood has been attained; and, where the owner can afford the time and outlay, set out a hedge-row of spruce on the side of the prevailing winds.

If we would secure a growth of tall, young, clear wood it must not only be shaded but sheltered. Our main resource must consist in planting. Although very much more might be said on this point, still what everybody knows is no news.

What our Legislature should do in the way of promoting tree planting is not quite clear. It is evident that the bonus system will not have the desired effect. Would it not be well to make it a statutory obligation on everyone who owns an acre of clear land, in fee simple, to plant or cause to be planted a given number of trees? By this means, everyone who owns cultivable land would be obliged to contribute his proportion to the general good; while by the bonus, or by the voluntary system, some would save their timber and plant more, while a next neighbour more selfish would destroy his timber and reap the benefit equally with those who do plant.

REPORT

OF THE

Ontario Veterinary College, Toronto.

SESSION 1880-81.

I have also the pleasure to present to you the Report of the Veterinary College for the year 1880-81, so ably presided over by Professor Smith, to be published in connection with the Report of the Council of Agriculture and Arts Association of Ontario.

Truly yours,

HENRY WADE, *Secretary.*

VETERINARY COLLEGE, TEMPERANCE STREET,
TORONTO, April 25th, 1881.

To the President of the Agriculture and Arts Association of Ontario.

SIR,—I have the honour to report that the Winter Session of the Ontario Veterinary College commenced on October 27th, 1880, and closed March 31st, 1881; and the attendance of junior students was greater than in any previous session.

The Christmas Examinations took place on December 17th, when the following gentlemen passed their final examination and received their Diplomas, viz.: C. Howell, Carlow; Albert G. Douglass, Perth; and G. W. Bell, Pakenham, Ont.

The Spring Examinations were concluded on March 31st, and the following is the record:—

FOR FINAL EXAMINATION.

T. Ashe, Brooklyn, N.Y.	W. A. Labrow, Perth, Ont.
W. B. Austin, Simcoe, Ont.	George T. Lount, Toronto, Ont.
A. H. Badgerow, Uxbridge, Ont.	W. E. Langford, Granton, Ont.
F. Brooks, Rochester, N.Y.	A. Logan, London, Ont.
D. Burt, Lynn Valley, Ont.	A. Maguire, Sheldon, Ont.
J. S. Butler, Stirling, Ont.	H. McElroy, Concord, Ont.
L. Carley, Laskay, Ont.	H. Ovens, Toronto, Ont.
W. Cain, Cheltenham, Ont.	W. Rose, Simcoe, Ont.
C. C. Crane, Sharon Centre, Ohio, U.S.	G. W. Thomas, Brantford, Ont.
F. Daley, Georgina, Ont.	E. Wells, Vittoria, Ont.
D. L. De Vose, Red Oak, Ohio, U.S.	W. Shaw, Lynn Valley, Ont.
J. A. Dell, Salene, Michigan, U.S.	W. J. Somerville, Buffalo, N.Y., U.S.
J. Fergusson, Toronto, Ont.	W. Steel, Topping, Ont.
C. M. Guston, East Wooster, N.Y., U.S.	C. A. Woodford, Rio, Wisconsin, U.S.
W. S. L. Honeyford, Parry Sound.	J. White, Whitby, Ont.
W. Huntsberger, East Union, Ohio, U.S.	

PRIMARY EXAMINATION IN ANATOMY.

E. S. Bartram, Laingsville, Michigan, U.S.
J. A. Calder, Glanford, Ont.
W. Langtry, Walsh, Ont.

W. Preston, Concord, Ont.
W. Sterling, New Hamburg, Ont.

IN MATERIA MEDICA.—L. LaReau, Tonawanda, N.Y., U.S.

PRIZE AND HONOUR LIST.

Seniors.

PATHOLOGY.—Silver Medal, J. A. Dell; 2nd Prize, J. S. Butler and A. Logan (*equal*).
Honours—A. H. Badgerow, F. Brooks, F. Daley, C. M. Guston, S. L. Honeyford, W. Shaw, and E. Wells.

ANATOMY.—Silver Medal, J. S. Butler; 2nd Prize, J. A. Dell; 3rd Prize, A. Logan and W. Shaw (*equal*). Honours—J. A. Calder, W. E. Langford, and A. Maguire.

ENTOZOA.—1st Prize, J. A. Dell. Honours—T. Ashe, J. S. Butler, D. L. De Vose, and A. Logan.

PHYSIOLOGY.—1st Prize, J. S. Butler; 2nd Prize, J. A. Dell; 3rd Prize, W. E. Langford. Honours—T. Ashe, E. Wells, J. A. Calder, and F. Brooks.

MATERIA MEDICA.—1st Prize, J. S. Butler; 2nd Prize, J. A. Dell. Honours—A. Maguire, A. Logan, T. Ashe, W. Shaw, D. L. De Vose, and E. Wells.

MICROSCOPY.—1st Prize, J. S. Butler. Honours—T. Ashe, F. Daley, W. E. Langford, and E. Wells.

BREEDING AND MANAGEMENT OF FARM STOCK.—1st Prize, \$20 in Books, J. S. Butler; 2nd Prize, \$15 in Books, D. L. DeVose; 3rd Prize, \$10 in Books, J. A. Dell.

FOR BEST GENERAL EXAMINATION.—Gold Medal, J. S. Butler. Honours—F. Ashe, J. A. Dell, A. Logan, W. Shaw, and E. Wells.

Juniors.

PATHOLOGY.—1st Prize, W. A. Dryden, Tavistock, Ont.; T. B. Cotton, Mount Vernon, Ohio, U.S.; and J. H. Reed, Georgetown, Ont. (*equal*). Honours—S. W. Burt, Simcoe; A. O. Graham, Georgetown; W. J. Lyon, Cheltenham; and A. Porteous, Simcoe, Ont.; Lyman Vandervoort, J. A. Waugh and W. J. Waugh, Pittsburg, Penn., U.S.; L. D. Blanshard, Mount Eaton, Ohio, U.S.; and D. P. Tonkerman, Cleveland, Ohio, U.S.

ANATOMY.—Silver Medal, J. H. Reed; 2nd Prize, W. A. Dryden. Honours—T. B. Cotton, A. O. Graham, and D. P. Tonkerman.

PHYSIOLOGY.—1st Prize, W. A. Dryden; 2nd Prize, D. P. Tonkerman, Lyman Vandervoort.

The Board of Examiners for Final and Primary Examinations consisted of Messrs. Coleman, Cowan, Ceasar, Duncan, Elliott, Sweetapple and Wilson, Veterinary Surgeons; and Drs. Thorburn and Barrett.

The following gentlemen also assisted: Messrs. O'Neil, Loyd, Grange and Hagyard, Veterinary Surgeons.

VETERINARY MEDICAL SOCIETY.

The Veterinary Medical Society, which was organized several years ago, and which meets weekly during the Winter Session, held its final meeting on Thursday evening, November 4th. Prof. A. Smith was elected President, F. E. Brooks, Secretary; W. J. Somerville, Treasurer; J. A. Dell, Librarian; J. S. Butler, Assistant Secretary; A. B. Maguire, Assistant Librarian. During the Session eighteen meetings were held, at which fifty-four papers were read and discussed on various diseases and operations of importance to students and to the profession generally.

At the close of the Spring Examinations the friends of the College, the students and others met in the large museum of the College, to witness the distribution of prizes, when the proceedings noted below took place.

PRESENTATION OF PRIZES.

Dr. SMITH, President of the College, upon taking the chair, stated that the prizes were about to be presented by the Hon. Adam Crooks, Minister of Education, his Worship the Mayor, Professor Buckland, and other gentlemen, whom he was pleased to have with them on that occasion. He then gave an interesting account of the origin of the College, and of the gratifying progress which had since been made, until at the present time there was a larger number of junior students attending it than any English-speaking college in the world. (Applause.) The Ontario Government had been very kind to him, having materially assisted him in his efforts to make the College as perfect as possible; and the natural consequence was, that students attended it not only from all parts of the Dominion, but from all quarters of the United States. (Applause.) He was very much pleased with the high standing of the graduating class, which numbered thirty gentlemen, who were about to leave the College to commence business for themselves, and he looked forward to a brilliant career for each one of them, if they would adhere to the line of conduct laid down for them by the professors, who had regarded them with pride and pleasure. (Applause.)

Hon. Mr. CROOKS was then requested to proceed with the presentation of the prizes, and upon rising to do so he was warmly applauded. He congratulated Dr. Smith, the esteemed President of the College, and his staff upon the happy termination of such a successful session as that just closed, from which it was evident the College since it was first established had gone steadily onward until they were all now proud of it. (Applause.) He was glad to be in a position to speak of the qualifications of Dr. Smith, which so eminently fitted him to discharge the duties of President, and he trusted that the agriculturists of Ontario, which was only second from an agricultural point of view to the blue grass districts of Kentucky, would justly appreciate the talents which Dr. Smith brought to bear in the discharge of his duty. (Applause.) He therefore trusted that the agriculturists of Ontario, as well as those of other parts of the Dominion and the United States, would see to it that they made the best use of the advantages held out to them by this College. Professor Buckland and Dr. Smith had done much for agriculture in this country, and he might be permitted to say that it was a fortunate day for Canada when it received such importations as those of Professor Buckland and Dr. Smith. (Cheers.) He (Mr. Crooks), as a member of the Ontario Government, was in a position to speak of the good effects of following the prudent counsel given by Dr. Smith in the management of diseases from time to time among cattle, by which thousands'—yea, perhaps millions'—worth of property had been saved to the farming community. (Cheers.) He had great pleasure in assisting to present the prizes which had been so deservedly awarded. (Applause.)

His Worship Mayor McMURRICH, upon rising to speak, was received with applause. He said that he also congratulated Dr. Smith and his excellent staff upon the character of the recent examinations, and upon the well-known success which had attended the College since it was established in this city; and he might be permitted to say further that the citizens of Toronto were to be congratulated upon the fact that the College had

been established here, because this was the centre of the Dominion, and consequently it should be the centre of education. (Applause.) But he was glad to observe that the College had more than a Dominion reputation; that it stood, in fact, very high in the estimation of their cousins residing on the other side of the lines, who came here annually in large numbers to attend the institution; and this was the kind of annexation he approved of. (Applause.) He trusted that when the graduates returned to their homes they would carry with them the fondest recollections of, and bear the kindest feelings towards, their *Alma Mater* from which they had received their diplomas. (Cheers.)

Dr. BARRATT spoke in the highest terms of the pleasure which he had enjoyed with his class during the session just closed; and it was pleasing to him to know that such a well-trained number of gentlemen were going abroad, where their knowledge of the proper treatment of disease would have the effect of alleviating the sufferings of such a large number of the lower animals; and he also maintained that the more highly educated were the students, the better would they be prepared to act humanely towards the dumb animals with which they would be brought into daily contact. (Applause.)

Prof. BUCKLAND alluded in pleasing terms to the establishment of the College, and spoke of the great and lasting advantages which had, in consequence, been conferred upon the agricultural community of this Dominion. He expressed the hope that the agriculturists of this Dominion, as well as those of the neighbouring Republic, would send their sons to the College, where they would be thoroughly trained for the proper discharge of their duties.

Ald. COLEMAN, of Ottawa, who had graduated at the College, expressed his pleasure at the high character of the examination just closed.

Addresses in a similar strain were delivered by Mr. C. Elliott, of St. Catharines; Mr. Cowan, of Galt; Mr. Wilson, of London; and Dr. E. T. Hagyard, of Lexington, Ky. (whose two sons had graduated at the College). Mr. Caesar, President of the Ontario Veterinary Medical Association, presented the gold medal offered by that Association to Mr. Butler, who had been so fortunate as to win it by hard work.

On motion of Ald. COLEMAN, seconded by Mr. SWEETAPPLE, the cordial thanks of the graduates and students were presented to the hon. the Minister of Education and his Worship the Mayor for their kindness in attending and assisting in presenting the prizes.

Dr. SMITH, in presenting the vote of thanks, personally thanked both gentlemen for their attendance.

Hon. Mr. CROOKS, in acknowledging the compliment, spoke strongly in favour of having technical education, such as that taught in the College, kept distinct and apart from the ordinary studies pursued in the schools; because when this was done the students became more thorough in their work, and the country received the benefit of it; and with regard to the aid given by the Government of which he was a member to this College, he said it was the best investment which could possibly be made by the Government, which, he might say, took the liveliest interest in the success of the Ontario Veterinary College. (Cheers.) He was much obliged for the vote of thanks which had been tendered to him. (Applause.)

The MAYOR having also acknowledged the compliment, a vote of thanks was presented, amid cheers, to Prof. Smith, the faculty, and the examiners, after which the meeting separated.

STUDENTS FROM ONTARIO AND FROM THE UNITED STATES.

Besides Canadian students, quite a number of students from the United States also attended, the following States being represented, viz.:—New York, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa, Nebraska, and Colorado.

Both Canadian and American students, I am glad to state, have been diligent in their studies, and have passed highly satisfactory examinations.

I am, Sir,

Your obedient servant,

* ANDREW SMITH, *Principal*.



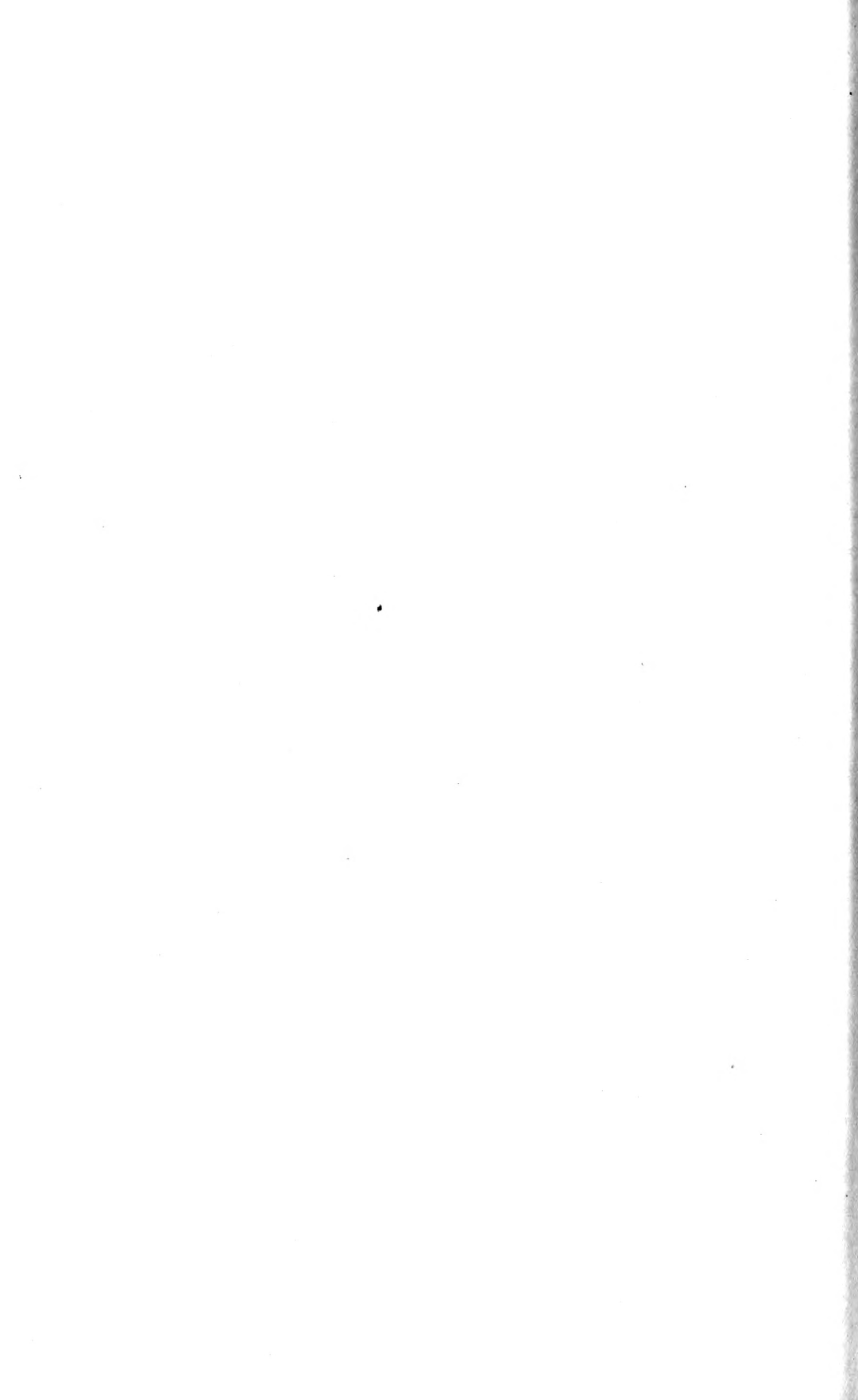
APPENDIX TO REPORT

OF THE •

Commissioner of Agriculture and Arts.

APPENDIX (C).

ANNUAL REPORT OF THE FRUIT GROWERS' ASSOCIATION OF THE
PROVINCE OF ONTARIO, FOR THE YEAR 1881.



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ANNUAL REPORT OF THE FRUIT GROWERS' ASSOCIATION OF THE
PROVINCE OF ONTARIO, FOR THE YEAR 1881.

To the Honourable the Commissioner of Agriculture:

DEAR SIR,—It gives me much pleasure to transmit to you the Report of the Fruit Growers' Association of Ontario for 1881, containing so much valuable information on matters affecting this very important branch of industry.

The discussions at the winter meeting have been very carefully taken down by a competent short-hand writer, and will be found to be exceedingly interesting.

The publication of the *Horticulturist* has been continued during the year; this monthly medium of conveying intelligence on subjects coming within the scope of the Association continually growing in favour with the members.

The important subject of Forestry has been also carefully discussed, and much valuable information collected.

Trusting that the efforts of the Association during the past year will meet with your approval,

I have the honour to be

Your most obedient servant,

D. W. BEADLE, *Secretary.*

PROCEEDINGS AT THE ANNUAL MEETING.

The Annual Meeting of the Fruit Growers' Association of Ontario was held in the City Hall, London, on Tuesday evening, 27th day of September, 1881.

President Dempsey was in the chair.

The business of the evening commenced with the reading of the minutes of the last Annual Meeting, which were received and adopted.

The Treasurer's Report was next read, received and adopted, as also was the Directors'.

The President's annual address was referred to the Committee on Printing, for the Annual Report.

After the general routine business the meeting proceeded to the election of officers for the ensuing year, with the following result, viz.:—

President—P. C. Dempsey, Esq., Albury, Prince Edward Co. Vice-President—William Saunders, Esq., London, Middlesex Co.

Directors—Division No. 1, John Croil, Aultsville; No. 2, P. E. Bucke, Ottawa; No. 3, R. J. Dunlop, Kingston; No. 4, H. Young, Trenton, Hastings Co.; No. 5, Thos. Beall, Lindsay, Victoria Co.; No. 6, Geo. Leslie, Jr., Leslie, York Co.; No. 7, W. Holton, Hamilton; No. 8, A. W. Smith, St. Catharines; No. 9, C. Arnold, Paris; No. 10, A. McD. Allan, Goderich, Huron Co.; No. 11, John M. Denton, London; No. 12, B. Gott, Arkona; No. 13, Chas. Drury, Crown Hill, Simcoe Co.

Auditors—John A. Bruce, Hamilton; Angus Sutherland, Hamilton.

At a subsequent meeting of the Directors Mr. D. W. Beadle, St. Catharines, was appointed Secretary-Treasurer.

DIRECTORS' REPORT.

To the Members of the Fruit Growers' Association of Ontario:

GENTLEMEN,—Although the year now closing has not been one as abundantly supplied with fruits of all kinds as was the previous year, yet we believe that the fruit grower will find the results of his labour to compare favourably with those of other tillers of the soil. We must not expect to escape the vicissitudes that attend upon enterprises of every kind.

Our own Society, we are happy to say, has continued to prosper during the past year. The attendance at the meetings has been very good, and the interest in the discussions well maintained. We obeyed your instructions and employed a short-hand writer to report the proceedings and discussions of our winter meeting, which was continued for two days, and have thereby secured an accurate account of what was said, which will appear in full in our forthcoming Report, and greatly add to its value.

The Midsummer meeting at Owen Sound was also well attended, and, through the kindness of the resident members, was made an occasion of much pleasure and profit. The *Canadian Horticulturist* has been continued during the year, and we think that the time has now come when we may safely venture to increase its size, and thereby add to its usefulness. There has been an increase in the membership during the past year of sixty, showing that we are gaining a little in public favour. The planting of fruit and forest trees at the Experimental Farm, Guelph, has been continued this year, and a large variety has been planted that we expect will in time become of great value in imparting to our young farmers a knowledge of the appearance and value of different fruits, such as will enable them to act judiciously in the planting of their own orchards.

TREASURER'S REPORT.

The Treasurer begs to submit the following Report of the Receipts and Expenditure during the current year:—

<i>Receipts.</i>	\$	cts.
Members' fees	1,198	00
Sale of back volumes of <i>Horticulturist</i>	1	50
Advertising	2	00
Government Grant	1,800	00
	3,001	50
Balance at last audit	518	24
	3,519	74

<i>Disbursements.</i>	\$	cts.
Postage and telegrams	57	67
Directors' and Committees' expenses	576	47
Freight and express	15	91
Duties	17	25
Printing	151	70
Plant distribution, 1880	394	90
Illustration, <i>Canadian Horticulturist</i>	97	61
Guarantee premium	20	00
Short-hand report	55	00
Commissions	27	97
Rooms—holding meetings	8	00
Clerk	100	00
Plant distribution, 1881	279	72
Binding and mailing, 1880 and part 1881	248	50
Paper and stationery	197	21
Audit, 1880	20	00
Secretary's salary	200	00
Editor's salary	300	00
	2,767	91
Balance	751	83

<i>Liabilities.</i>	\$	cts.
Printing	325	00
Audit, 1881	20	00
Binding and mailing	65	00
Directors and Committees	135	00
Postage	15	00
Paper	190	00
	750	00

We certify the above to be a correct abstract.

JOHN A. BRUCE,
ANGUS SUTHERLAND, } *Auditors.*

THE PRESIDENT'S ANNUAL ADDRESS.

Gentlemen of the Fruit Growers' Association of Ontario,

The usages of your Association make it obligatory upon the President to deliver an Annual Address. Occupying, by a singular mistake of the Society, the position of President, I attempt to perform a duty that should have been given into abler hands.

Friends of Horticulture,—We meet again, after the labours of another year, to exchange friendly greetings—to look back upon the results of our toil, and with words of cheer to encourage each other to new endeavour. The lessons of past success or failure will alike instruct us, and if rightly learned we stand to-day on vantage ground to take up the work of the coming year. Our meetings during the year have been of more than usual interest, and well attended. The discussions, to those who had the privilege to take part in them, have been of a very important character, and I only regret that any of our members have been unable to avail themselves of these opportunities for receiving and imparting information. You, gentlemen, who have taken part in promoting the usefulness of this Association, have reason to feel proud of so great a work already achieved. The results of your labour are now to be found everywhere in very much improved systems of the cultivation of fruits. The orchard is beginning to receive some considerable share of the attention of the farmer. Finding that no insignificant part of the income of the farm is derived from the orchard, more extensive plantations are being made, and enquiry instituted for the varieties most likely to be remunerative. It is to be regretted that many of the older orchards were planted with varieties not profitable for market, or not calculated to withstand the severity of the climate, which had its effect to discourage the cultivation of fruit in many sections. In this your labours have been appreciated, aiding them to make better selections of varieties that are better suited to their soil, climate, commercial and culinary purposes. We now find among us farmers who are well informed as to varieties and the better methods of cultivation; and though it is true that some of them will tell you that they were never members of your Association, yet we find that the reading of our discussions, published, however imperfectly, in their paper, has been of no small service to them—so great, indeed, that if they would only reflect for a moment they must surely see that they have lost much by not attending our meetings, and participating in our discussions and interchange of ideas. Nor is it merely loss of practical information of no small value. Does it not help us much in our individual struggles to meet now and then with those who know the same trials—to grasp their friendly hand and enjoy their sympathy? And when we have told what little we know, garnered from our own experience, is there no pleasure in the thought that perhaps we have helped some toiling brother up his hill of difficulty?

CATALOGUE OF FRUITS.

It has been the opinion of some of us that a catalogue of the fruits cultivated in our country would be useful to the majority, but there are very great difficulties attending the publishing of such a work. Such is the effect of climate, for instance, upon the different varieties of fruit in different localities, that an apple which will succeed at Niagara is often found to fail in the more eastern counties. The culture of the peach is confined very nearly to only three of our agricultural divisions, while the grape and most of the small fruits have been found to succeed in almost every part of Ontario. Your Committee has asked each Director to make a report from his division upon the fruits cultivated therein. These reports will not only be of great practical value to the fruit-grower, but will largely take the place of a catalogue, and remain among our records for centuries, and become a history of the progress that is being made by your Association.

INCREASE OF MEMBERSHIP.

We often ask ourselves how can we best manage so as to increase our membership. We tell the people that they will get a copy of our report, to which they reply, "We get

it from our member." Then we tell them that they will be aided in making their own place an experimental garden; that plants are annually distributed among the members; and to this they often reply that "Neighbour So-and-so received one and it died," or that it proved to be no better, or perhaps not as good, as sorts he already had; as if such things were not to be expected. Let me give you a leaf from my own experience in this direction. I have imported some hundreds of varieties of apples and pears from Europe, all of them supposed at the time to be far better than any we had, and out of all these I have now not more than five or six apples, and perhaps as many pears, that have proved to be of superior value. Should this, gentlemen, discourage us from continuing our experiments? If, out of hundreds, we succeed in getting one variety of great value, is not that a sufficient reward? Have our hybridists lived in vain because they have succeeded in producing but two or three really superior varieties in a life-time?

OUR PERIODICAL.

Gentlemen, we have undertaken the publication of the *Canadian Horticulturist*, and its free distribution to our members. I find it is being highly prized among them. By means of it we can disseminate an immense amount of knowledge. It is true that in its commencement we could scarcely see our way to undertake so great an enterprise, but the increase in the Government grant has enabled us, with the most rigid economy, to meet the expenditure. We hope next year to be able to print it in double columns and add eight pages to its size, thus making it as valuable as any other periodical of its kind published upon the continent.

The advantages which this Association offer to its members, I am happy to say, are being appreciated. There has been a gradual increase in our numbers for the past few years, and small as it seems to us who are anxious to extend its benefits to every one who tills a rod of ground in the Province, I find, upon examination, that we really number fully three times as many members as any kindred Association, not excepting the great American Pomological Society.

FORESTRY.

It is but a short time since the subject of Forestry was undertaken by you, and already you can begin to see the results of your labour. Questions are being asked as to the best way to ornament grounds by the planting of trees, or to increase the value of our farms by roadside planting, or by planting on lands that, being rocky or broken, do not admit of cultivation. Some have already commenced such planting, and who can compute the increase in value of every farm in the Province when our country roads shall have become avenues of stately trees, and our rocky fields and broken hillsides are covered with profitable timber? Attention has already been turned to the planting of the black walnut as a profitable timber tree, whose rapid growth, combined with the high price of its lumber, gives it a prominent position. The maple and elm and basswood, when planted along the roadside and thus given room for development, become objects of great beauty. Who of us does not enjoy not only the beauty of such trees, but the grateful shade they afford us when driving on such hot days as we have but recently experienced? And is not all honour due to those municipalities which are encouraging such roadside planting by the granting of premiums and the enacting of suitable protection?

THE GARDEN.

This has been too much neglected, particularly by our rural members. There is no part of the homestead more attractive than the well-kept garden. I know a person that prides himself on keeping his garden in good condition, and I have known persons to come long distances just to stroll around his garden and admire his beautiful blocks of roses and other well-kept flowers. I could always enjoy a visit to his well-grown pears, grapes, dwarf apples and plums. The small fruits were never neglected, and in their season became a source of attraction not only to the stranger who visited his grounds, but to his own family. His vegetables were always good, and he was never heard to complain that

it was a bad year for this or that, but with thorough cultivation overcame every difficulty that would arise, so that his crops were seldom failing. Thus his family has more attractions at home than abroad, and his table is always supplied with choice vegetables, luscious fruits, and a beautiful bouquet.

THE FRUIT CROP.

This season has not been an unbroken success. In many places strawberries appeared very promising, but a severe and cutting frost came about the first of June and destroyed the greater part of the crop. Notwithstanding this, the yield in some localities was never better, and the crop of raspberries and other small fruits has been good. Grapes have failed in some localities, being in bloom at the time when that June frost occurred, but the fine display of beautiful samples at the Exhibition prove that the failure has been by no means general. The apple crop is very short over nearly every part of the Province, and those who are so fortunate as to have a few hundred barrels of prime winter apples may look for remunerative prices. After such an abundant crop as we had last year, it would be expecting too much from our orchards that they should yield a full crop this year. Indeed, the fact that our apple trees generally bear in alternate years has become a recognized element in our calculations. The pear trees, in many sections, have been suffering from blight, in some more than was ever known before. It has been my privilege to visit several pear orchards this summer; some of these were in sod, some were neglected, and some were cultivated, but I can assure you that for profitable results the comparison was decidedly in favour of cultivation.

PROBABLE DEMAND FOR OUR FRUITS.

While our apples are being sought for in England, many of us seem to fear that there will soon be such an over-production that there will be no sale for our fruit; but let us bear in mind that while Britain requires fully two millions of barrels of apples per annum more than they ever grow, last year, when we had the largest crop that Canada ever produced, we were not able to send them two hundred thousand barrels. Our cities, at their rapid rate of growth, will require a large and yearly increasing amount to supply them. Our great North-West, I believe, will increase in population at a far more rapid rate than our supply, so that I can see no reason for apprehension that the demand will not for many years keep pace with the supply. As fruit-growers, let us extend our business, grow only those varieties which are best suited to our markets, and send to market only first-class samples, and we need have no fear of overdoing the trade.

PROTECTION.

While the manufacturer, mechanic and farmer are asking for protection, permit me to say that there is no class of producers that stands more in need of protection than the horticulturist. Why should he alone of all those who by their labour are contributing to the building up of this Canada of ours be left to struggle against such fearful competition? No sooner has he planted a tree or grape vine or strawberry bed, and with expectation full of hope is waiting for his returns, than, alas! he finds that he has a competitor in the field—a competitor that to others may seem small and insignificant, a mere tiny moth perhaps that one may crush between his fingers, or crawling caterpillar you could trample under foot; but it comes in such stealthy way, or in such overmastering numbers, that the hopes of a season perish in a night. Or when his ripening melons are giving promise of a golden harvest, a troop of boys swoop down upon his labours and leave but a wreck behind. Against these, and many such like pests, has he not great need of protection? To our Entomological friends we are under many obligations for the valuable help they have given us in pointing out the several methods of protection against our insect foes; but against these marauding boys, who will devise an effectual defence? I can only suggest that we induce the Legislature to pass an Act making every man a constable for the protection of the fruit-grower, as is the case in the neighbouring State of New York.

The winds have often such unbroken sweep that they carry away the pollen, so that it cannot fructify the blossoms; or if these chance to set, they shake down the fruit before it ripens, or break the branches, or with wintry breath kill the fruit buds. Therefore, I suggest that in the planting of orchards we select, as far as possible, sites protected by hills or forests, for the protection nature affords will be found much more reliable than that of legislation. Where these do not already exist, a belt of trees planted to windward will be found not only a shelter to the orchard, but an ornament and improvement to the farm. Then there is the mildew, which will sometimes ruin our grapes, and we ask how to prevent it. My own experience leads me to suggest that the best protection against mildew is to plant those varieties known to be least subject to its attacks. No wise man will plant extensively any variety without first inquiring whether it possesses a healthy constitution, and foliage not liable to the attacks of mildew. By observing this simple suggestion one may often protect himself from serious disappointment and loss.

We have this season experienced a drought of unusual severity. How can we best protect ourselves from the serious effects of these long-protracted droughts? We have lately seen trees stripped of their foliage, fruits dropped prematurely upon the ground, and strawberry plantations nearly killed outright. Is there no remedy for these evils? Permit me to suggest that I think there is—that by the frequent stirring of the surface we can to a large extent prevent the ill effects of drought, and preserve our orchards and gardens in a growing state. If any doubt the efficacy of this method, I wish that they would give it a trial next season, by keeping up a frequent stirring of the soil during the whole period of plant growth, not waiting for the drought to set in before they begin operations.

Another matter of protection I must not leave unnoticed. It is one upon which I feel particularly qualified to speak, if considerable experience can be considered as constituting a qualification. Perhaps there are some in this audience who have not had the pleasure of sending their season's crop to market. The fruit was gathered with care, sorted with nicety, put up in clean barrels, and consigned to the commission man, and they waited for the returns—a draft, a cheque, a post-office order—and though this took place perhaps years ago, they are waiting still. If there be any such present they will know what I mean. Now, against such disappointment I think the fruit-grower may justly ask for protection. If I entrust a man with my money and he applies it to his own uses, he becomes a defaulter. If I entrust my fruit to a man to sell and he applies the proceeds to his own uses, why is he not a defaulter and a criminal? The fruit is not sold to him; he is merely my agent to sell my fruit; and when it is sold the money he receives for it is my money, and when he applies it to his own uses why should he not be liable to criminal prosecution? This is a case for legislative protection, and producers must make themselves heard in the halls of legislation until the law is so amended that middlemen who do not pay over the proceeds of products consigned to them for sale are treated as criminals.

The Council of the Agricultural Association has awarded a silver medal to the manufacturer of a waterproof boot, thereby indicating their sense of the injurious effects arising from wet feet. Not only do our sons and daughters, however, go into a state of premature decline as a consequence of wet feet, but the evil effects of wet feet may be often seen in the early decay of our most valuable fruit trees. I do not know that any one has thought of offering a silver medal to the manufacturer of waterproof boots for apple trees, but this I have seen—orchards, and not a few, dying of wet feet. The only remedy, however, with which I am acquainted is, not the use of a boot to protect their feet while standing in the water, but to first so drain the soil that there shall be no water in which their feet can stand. I cannot too urgently press upon your attention the truth that an orchard will not thrive in a wet, cold subsoil, and that if you want healthy trees you must protect their feet from the wet.

Gentlemen, for me to prolong this address would be but to weary you. I thank you for the courtesy you have shewn me in listening so patiently and so long to my desultory remarks. I trust that in my successor you will have one better able to interest and instruct you.

DISTRICT REPORTS.

The following reports were handed in after the reading of the President's address, and ordered to be printed in the Transactions of the Association :—

REPORT FROM DISTRICT No. 1.

As requested by the Fruit Growers' Association of Ontario, I beg to hand in the following report :—

Flowers.—I am happy to say there is in our District an interest and taste for garden ornamentation, which goes on increasing. When I took up my residence in these parts, anything worthy of the name of a flower garden was a curiosity ; now most houses have their flower plot—not a few of them that desirable little enclosure worthy of the name of garden. In addition to the old flowers (many of which, by-the-by, excelled in beauty the new kinds) we have geraniums, fuschias, petunias, zinnias, stocks, gladiolus, coxcombs, asters, balsams, verbenas, antirrhinums, etc., in endless variety. I had almost omitted the Drummond phlox, of which the man is said to have lived and said, “Let me have but one flower in the garden, it will be the Drummond phlox.” But the list is only commenced. Add to it at least one hundred kinds more, the best picked from the best catalogues, and you will have some idea of the kinds cultivated in these cold regions. So much for flowers.

As for *Vegetables*, with very few exceptions every seed recommended in the Montreal and Toronto catalogues will grow and succeed here. Many of our farmers, to be sure, content themselves with a limited assortment of the more useful kinds, but in many gardens specimens are to be found of nearly all. For new kinds introduced lately, I must refer to a special list I am requested to send to Mr. McD. Allan, Chairman of Committee, to which I dare say he will give publicity.

In the matter of *Apples*, a report of kinds grown in our neighbourhood will also be found in Mr. Thos. Beall's returns, from particulars furnished by myself and others.

The following *small fruits* are commonly cultivated and succeed well here :—Strawberries, raspberries, blackberries, currants of different varieties. Gooseberries are grown, but not successfully, mildew being the chief drawback. Perhaps I am tempted to speak disparagingly of this fruit, having seen specimens in Auld Scotia, a month ago, thriving as I had never seen them do before. In a garden I visited near Glasgow, the bushes (I should rather say trees) were loaded to such an extent that my veracity would be questioned were I to venture an estimate of the quantity on each bush ; but let me say that the man's teeth that didn't water at the sight of them needed readjustment. I asked my friend, the owner, how old these bushes were. He was an honest man (a minister, too) ; he assured me to his certain knowledge they were thirty years old at least.

Out-door *Grape Vines* do well with us, but require to be laid down and covered in winter. I am cultivating about twenty varieties. The hardiest varieties I have tried are the Delaware, Hartford Prolific, Burnet and Creveling.

I have trespassed long enough on the readers' time and patience, and crave their indulgence for omissions.

JOHN CROIL.

Aultsville, 14th September, 1881.

REPORT FROM DISTRICT No. 2.

Strawberries have been a fair average crop, but have not yet been raised in sufficient quantities to supply the local markets, especially for Ottawa City. Owing to the duty of two cents per quart imposed by the Government, at the instigation of the Fruit Growers' Association, nearly all the berries brought here from a distance were raised in Canada. Prices ruled from ten to twelve and a-half cents per basket retail, extra lots fifteen cents. It is believed too much barn-yard manure is used in raising this fruit by the local gardeners here, which has the effect of making the top soil porous and dry. Thoroughly rotted sod, after a crop of potatoes, is probably the best preparation for setting the

plants, and an application of phosphates, or bone meal, wood ashes and salt, having due regard to the quality and condition of the soil, would be found to produce heavier crops and better berries, with a less show of leaves.

Currants, red and white, when protected the previous year from the injurious attacks of the saw fly, have produced full crops as usual. It must be remembered, however, that a heavy yield is exhaustive to the plant, and good cultivators will return to the soil stimulating manures to insure good results in 1882. For this purpose a compost of night soil with dry earth is probably the best thing to use, and should be applied before winter sets in as a top dressing.

These remarks apply also to the *Gooseberry*, of which probably Smith's Improved takes the lead over the Houghton and Downing, where the European varieties cannot be grown.

Raspberries.—The cultivated reds and whites, which received careful protection during the winter of 1880-81, were very productive and gave fine fruit. The saw fly, from which they had hitherto suffered considerably, was not so injurious during the past season.

Black Caps did fairly well, but it is questionable if they will ever be made to produce as remunerative a crop as the reds or the strawberry: nevertheless, they were in good demand, and are gradually coming into favour. As a canning fruit they have few equals, as any good housewife can testify who has given them an impartial trial, and they make a thicker preserve than the reds or strawberry.

The *Swanders Raspberry* does well either preserved or canned: being of a sub-acid flavour, its individuality is not lost in the dead sweet of the sugar. Some seedlings are being raised from this variety which promise good results.

Apples are scarce; even the crabs are not up to their usual crop, and the trees of the latter have blighted badly. The twig blight has attacked, for the first time to any extent, almost all the varieties of apples in this neighbourhood. The partial crop of the fruit in the western part of Ontario will, it is feared, produce an apple famine in this locality.

Plums.—The wild sorts have been quite abundant, but, owing to the western crop of cultivated varieties being light, these have sold better than usual; anything like a good sample have brought forty cents per pail. The Greenfield—the largest red plum raised here—was sold at twenty cents per gallon. The Glass seedling sent out by the Fruit Growers' Association is fruiting in many localities, and those produced are unusually fine. The Yellow Orleans Gage, though too tender for a crop, is producing some fine and high-flavoured fruit, and the Horse plum is making a fair show. On the whole, plums in this section are doing better than they have ever done before.

Grapes are making a fine show, and ripening earlier than usual. Champions were well coloured by the 1st September, and were closely followed by Hartford, Miller's Burgundy, Aylmer Sweet-water, Chasselas of Fontainebleau, Creveling, Delaware, Burnet, Dempsey's 60, Lindley, Agairand, Concord, Dempsey's 25, Iona and Arnold, Othello, Autuchon, Brant, and Canada. Salem proved an entire failure, owing to mildew and rot. The grape crop of 1881 in this section has never been exceeded either in weight, earliness, or the area planted, which is gradually increasing. A few more such bright seasons as we have had this year will go far to establish this enterprise on a solid and lasting basis. Ottawa and its vicinity has shown itself fully equal, if not superior, to the far-famed regions of Western Ontario for the production of this fruit. One great lesson has been learned, and that is—to have fine and early fruit, the vines must not be allowed to overbear. Two bunches on each bearing cane are found sufficient even after the vine has attained mature age, and is in full bearing condition. The greatest curse the vineyardist has to contend with is the thrip. A good specific for this insect pest, for out-door vines, would be a most desirable acquisition to the grower of this sub-tropical fruit.

In conclusion, I have much pleasure in reporting that the cultivation of fruit is fast spreading about here, and for the production of small fruits and grapes I see no better locality in any part of Canada. Respectfully submitted.

P. E. BUCKE.

Ottawa, 1st September, 1881.

REPORT FROM DISTRICT NO. 8.

In reference to fruit in this section of Ontario, I must report a very fair crop in many lines. The strawberry crop was good, and good prices realized; currants a good crop; berries fair; plums very light—many varieties set good, but the curculio caused them to drop; pears a very fine crop—almost every tree that bore the name bore the fruit also, and generally smooth and free from snarls and imperfections. Oh, could we but banish the blight or find a remedy. Peaches—what shall I say? We all thought the crop would be a very light one, but when they came to mature I tell you they were unhandy to pack; three tiers were far too many to fill a basket, and two not quite enough—like the chicken, a little too much for one and not quite enough for two—and the quality all that could be desired, and prices satisfactory. Grapes a good crop, but are going to fail in many places for the want of rain, and will lack in flavour. Apples: The crop will be short—about one-third of an average I should say—and in many places small in size, on account of the extreme drought, especially on heavy land and where cultivation was neglected, and I fear the drought will injure their keeping qualities; the early varieties were not plentiful, but were of fine quality.

Flowers: I am not very well posted, but to judge from the many fine samples I should say the season has been a good one until now. Vegetables I believe are a very fair crop; I have heard very little complaint of the ravages of insect pests. The potato bug of course was very numerous, but our people have learned to combat them successfully. Forestry: Our forests, which are rapidly passing from our view, also show signs of this extreme drought; the leaves on many a fine old stately tree are showing the yellow leaf of autumn. I trust, Mr. Secretary, you will excuse this hurried and imperfectly prepared report, but after passing through two weeks of extreme heat, rushing one variety of fruit on top of the other, well may the fruit-grower say that "time and tide wait for no man."

Yours respectfully,

Grimsby, Sept. 7th, 1881.

A. H. PETTIT.

REPORT FROM DISTRICT NO. 10.

Soil.—This district, comprising the Counties of Huron, Bruce and Grey, rejoices in a variety of soil. In Huron a clay loam predominates, and along the lake shore we find it mostly a light loamy or warm sandy soil, and occasionally ridges of gravel and flats of dark loam. The subsoil is clay and gravel mostly. In Bruce we find clay, light and black loam, sand and gravel, pretty evenly distributed with the clay and sandy subsoil, and occasionally traces of limestone deposits. Grey varies greatly, but where soil fit for agricultural purposes exists the predominating kind is clay. Large sections are covered with limestone rock, interspersed with gravelly loam. In the vicinity of Owen Sound we find a mixture of sandy and clayey loam, with a subsoil of hard clay or rock.

Climate has completely changed in the last 30 years. Especially is this noticeable in the absence generally of late spring and early fall frosts, so that we are enabled to grow in the open air now fruits and vegetables that 30 or 20 years ago would surely perish either in early summer or before maturity in fall. The present season, however, has proved an exception in many sections, the late spring frost having made sad havoc among fruits and fruit trees. In the central sections of Bruce, and through Grey generally, as well as the inland portions of Huron, we find complaint of blossom killing. In Bruce the frost of June 6th cut off the strawberry bloom entirely, and the fruit crop generally of early blooming varieties was mostly all cut off; indeed the crop of apples, pears and plums this year in that county will be but a small fraction of the ordinary yield, with the single exception of crab apples. The extreme frost in February last killed thousands of trees and vines throughout this district. Only on the Lake Shore sections do we find growers free from these influences, partially or wholly. But the season now coming to a close has so far been an exception, and we hope to meet with such exceptions, if at all again, only at very long intervals.

Strauberrries are grown largely over the district, both by regular growers for market and by amateurs for private consumption. Although there exists a diversity of opinions as to the relative merits of our many varieties, yet all willingly agree in testifying to the

profitableness of the crop, especially in small garden plots for family use. Among large growers the Wilson's Albany has for years past been exclusively grown for shipment, but now we are glad to be able to report an advancement in taste, and soon the Wilson's Albany will have to give way to some finer and more palatable varieties. When pocketing our ten or eight cents per quart for the Wilson, we cannot help feeling a twinge of conscience at our gain, which will surely bring *internal* discord in the family of the city consumer. The fact is, Wilson's Albany is a good strong grower, a prolific bearer and a good shipper; but in order to reach the market and allow sufficient time there to reach the unfortunate consumer, the grower picks it before actually matured. It is picked when a fine lively bright crimson, and certainly looks very attractive, but it is not ripe, and has only commenced to acquire that true strawberry flavour which is so delicious and enjoyable. The fact is, that so long as growers pick and ship this variety as they now do, consumers who depend upon them will not be purchasing better than a third to a fourth-class berry. At its best we do not look upon it as better than second-rate. One Huron grower has an acre of Triomphe De Gand, and he finds ready sale locally for his crop in preference to Wilson's, which has to travel cityward now since the advent of this variety. There appears to be a desire among growers to find a berry that has all the good qualities of Wilson's Albany for cropping and shipping, together with a superior character in other respects. Sharpless is gaining in favour, and already has been shipped as far east as Toronto by way of experiment, and with gratifying results, having brought wholesale ten cents per box, while Wilson's Albany sold for six and seven cents. Arnold's No. 23 is spoken highly of as likely to prove a fairly good shipper. It certainly is a strong grower, prolific, and of extra fine quality. Crescent Seedling is variously spoken of as medium to good; some complain that it does not ripen evenly, while others say the difficulty is that as a cropper it cannot be depended upon. Col. Cheney and New Dominion are being tested largely, with very favourable results. In Huron the strawberry crop the past season was injured by late spring frost, and therefore was not much over half the average yield. The crop finds ready sale in our towns and villages, where most of the past season's crop was consumed. Small shipments were made to Mitchell, Stratford, and other towns. The price averaged ten cents per quart retail, and seven cents wholesale. In Bruce the crop was a failure, having been entirely destroyed by the June frost, so that the local markets had to import a supply from Hamilton and Oakville sections. In Grey, strawberry culture is largely on the increase, and now the section around Owen Sound produces sufficient to supply that and many other towns and villages in the county, besides making large shipments to other sections. Prices range from six to twelve cents per quart, depending upon samples and state of the market. Wholesale prices are as low as five cents. Probably there is no section of this district better, if so well, adapted to the cultivation of strawberries as that in the vicinity of Owen Sound. The soil there upon which this crop is grown most successfully is composed in about equal parts of sand and clay, not too stiff to be difficult to work, and strong enough to give a luxuriant growth. Large quantities of the wild strawberry are still found in sections of Bruce, and bring good prices even in competition with cultivated varieties. The entire crop of this district would average about 2,200 quarts to the acre for the season, the largest average yield being at Owen Sound.

Raspberries have not been cultivated largely in any part of the district on account of the plentiful supply of wild fruit, which sells freely at from sixty cents to one dollar per patent pail. But it is altogether likely that growers will plant largely of cultivated varieties now that the market has been tested successfully with them. It was feared that the wild berries would make the cultivation of our fine varieties unprofitable, but those who have made a trial report that there is a rising demand for the finest fruit, and that raspberries can be cultivated profitably. Encouraged by this experience, we find growers planting freely of the finest varieties. Those that have been tested in Huron are Philadelphia, Franconia, Turner, Brinkles' Orange, Herstine, Highland Hardy, Brandywine, Arnold's Diadem, Clark, Kirtland, Cuthbert, of red varieties, and Doolittle, Gregg, Davison's Thornless, and Ontario, for black varieties. All of these have proved hardy along the lake shore. Of these varieties the Philadelphia is considered the best cropper and most valuable among the reds, and Gregg for black. It is found beneficial to shorten

in the canes early in the season, so that they become thoroughly ripe before winter sets in. This precaution is claimed also to be of great value for inducing the cane to branch out more than it otherwise would, and therefore give a larger yield. In Bruce we have only found a few isolated cases of raspberry-growing by amateurs for home use. In Grey, however, things are different. Growers report the prospect as very encouraging, and they find no difficulty in competing with wild berries in the local market. The first four red varieties above named are grown very successfully. The even fall of snow in winter protects some of the more tender varieties in Grey that could not be grown so successfully in any other part of the district for the want of that protection, unless we except the section of Huron in the Goderich vicinity. A friable clay loam suits the raspberry well. We have what is known as the Thimble berry in our local markets; perhaps the finest we have ever seen are grown in the northern parts of Bruce; each berry is actually as large as a thimble, and precisely of the same shape; they are jet black in colour, flavour wild, slightly sub-acid, and very pleasant. A dish of these with a slight sprinkle of sugar and good country cream would tickle the palate of a king.

Gooseberries have been tested pretty thoroughly in Huron, and now growers are satisfied to keep Downing and Houghton's Seedlings and Smith's Improved, discarding all else on account of the mildew. The finer foreign varieties have been tried, and coaxed in every imaginable way, but they would invariably mildew. In Grey, besides the varieties mentioned, we find Crown Bob, Ironmonger, Yellow Sulphur, Whitesmith, Roaring Lion, and other foreigners, growing and maturing perfectly. They are not troubled with mildew, possibly on account of their stronger soil, which inclines more to the clay loam. But they don't appear to feel encouraged by the local market demand for this fruit, and are therefore slow to spread their gooseberry plots. Outside consumers desiring this fruit could easily obtain an abundant supply on the Owen Sound market.

Currants of the red and white varieties can be found going very slow in company with the gooseberries on the back shelf of our local markets, and hence they are grown only by amateurs. Black currants, on the other hand, are in demand; the supply has never reached the demand, and prices rule high. Naples sells at eight to ten cents per quart, and Lee's Prolific at ten to twelve cents; and still we do not find a disposition to increase the breadth of acreage under this crop. But few appear to know that it is necessary to give any attention at all to the black currant. The fact, however, is that the fruit-grower cannot make more profit out of any crop on his farm than this when properly attended to. It is necessary to cut out all old wood from year to year, and work and manure the land well. Indeed, if an abundance of manure is not given to Lee's, the bushes may as well be rooted out and burned, as the fruit will dwindle away and lose also in flavour; whereas, if well manured, it will bear large crops of most delicious fruit, finer than Naples for preserving, and more prolific as a crop.

Blackberries have not been grown for market, and only in a few instances we find amateurs who have them. Kittatinny gives satisfaction in the Goderich district, but proves tender at Owen Sound; Snyder and Taylor have proved hardy at that point, however, but the former is considered too small to be valuable, and the latter is considered "best." Sheriff Moore, of Owen Sound, has a selected wild variety that succeeds admirably, and growers there are likely to grow this and the Taylor in preference to any others.

Cranberry culture has been spoken of repeatedly, and at one time we thought a large acreage would soon be under this crop on Maitland Flats at Goderich. The large supply of the wild berry from marshy lands has doubtless held the market, but now that many of these well-known cranberry marshes are being drained, the market will demand a supply of fruit by regular cultivation. We cannot imagine a more profitable use to put the Maitland Flats at Goderich to; and they are admirably adapted for this purpose, both in quality of soil and especially that they could be flooded without much expense or trouble.

Quince.—The quince bush looks like an outcast, a tramp, wherever we see it here. It is not cared for at all, but planted in a fence corner, beside a stump, or on some refuse spot condemned for all other purposes. It rarely receives cultivation or dressing, and if its branches are broken down or off by the winter snowdrift, the public opinion seems

to be "it serves you right." The wayfaring cow is not hunted off for browsing on the quince, nor the schoolboy checked for whittling it up into switches.

Cherries succeed well in all parts of this district, and the yield the past season was fully up to the average. Possibly we have no fruit tree that requires so little cultivation and dressing as the cherry. It seems to succeed best on our light soils, where no manure is used; indeed, manuring often has the effect of inducing too rapid a growth of wood, which often results in splitting the tree. For some years past we have been troubled with a disastrous fungus rot in the cherry, which carried away the crop before it reached maturity. This disease always seemed worse in the heart varieties. This year we had no trace of rot, but an equally bad enemy existed in the robin, which seemed to destroy the crop just as it ripened. Growers are taking the law fairly into their own hands now, and war has been declared against the robin and cherry bird. Fair notice has been given, and next season will witness a terrible mortality among these pests. Napoleon Bigarreau is a grand cherry, and those who know them would not be without Elkhorn and Black Tartarian. Elton is good; Kentish is largely grown for market—the demand for it is large for canning purposes.

Peaches have been grown for many years in the Goderich section, and now the crop is becoming important. The local markets are fully supplied, and an overplus for export in favourable years. This year the crop is not much more than a half yield, and owing to the extreme drought the samples are small. In this section peach-growing is sure to become an important industry. The light, warm soil is suitable, and the absence of severe early and late frosts generally ensures a crop. We grow a long list of varieties, but after all growers agree that the Alexander, Early Crawford, and Hale's Early are the most profitable. Old Mixon is good, while Mountain Rose has several friends. Prices have kept pretty even at \$1.50 for a basket, which is about \$3.50 per bushel. Beatrice is not held in as high favour as in former years on account of its small size. The public appear to be willing to wait for a larger peach than Beatrice, rather than pay a fair price for its extra earliness. Early Rivers comes in about the same time as Alexander, but is not so good a peach. Early Canada lacks in flavour. For later fruit we have large quantities of home seedlings that flood the local markets, and cut prices of late varieties down low. The crop this year being small, it is not probable the price will go under \$2 per bushel for late varieties. The peach is not grown for market in other parts of this district to any extent yet, but from present indications it is probable Owen Sound fruit-growers will do something in the cultivation of peach orchards. Already there are many amateurs who have grown the early varieties successfully, and so far trees have not suffered much from winter-killing. It is found to be highly beneficial to assist the ripening of the wood by *breaking* the tips early in the season, and then when growth has ceased take off these broken pieces with a sharp knife. If the tips were nipped off early, the next bud would push forward new wood, and destroy the object of shortening; but by merely breaking the tips, and allowing the broken ends to hang for a couple or three weeks until growth has ceased, a good object is attained, and the wood fully ripened. Some growers think the peach should be hardier and bear better where grown as a dwarf, but our experience is that best results are had in orchards of standards. In Bruce, peaches are grown in the vicinity of Kincairdine, but more inland they have only been tried by few amateurs. With proper care and attention in planting on a northern aspect, mulching well, and shortening in the wood in the way indicated, we believe peaches can be grown successfully all over this district. It would be well for fruit-growers to pay more attention to the propagation of good early seedlings, as they are certainly hardier, and more prolific and longer-lived than our list of known varieties. It stands to reason that they should be, as they are "to the manner born." We have not seen the first trace of yellows in any part of the district, and this fact, no doubt, is because care has been employed in the selection of stock. For the past two years growers have propagated from home stock rather than import fresh, for fear of introducing the yellows.

Apricots and Nectarines are not largely cultivated, although the fruit is fine for canning and preserving, and the trees are hardier than the peach. In Grey we have seen some fine specimens of Breda and Early Golden. Besides these we have Moorpark. Barton and Stanwick, doing well in Huron. In Bruce we have seen, this season, good

samples of Barton, Early Golden and Moorpark. Several seedlings are scattered over the country of more or less excellence. We have one old tree (a seedling) inside the gaol wall at Goderich; despite bad usage and neglect it has withstood the storms of years, and as regularly yielded up a load of delicious fruit. One would imagine from the treatment apricots and nectarines receive at the hands of growers that they were closely related to the unfortunate, much-abused Quince.

Plums.—In Huron it has become disheartening to write of the plum. The curculio has so completely taken possession of our orchards that growers are inclined to prune their trees close to the ground. However, year after year passes, and we become more accustomed to the little Turk; it does not seem to grow worse—indeed some think it was not so destructive this year as usual, but this is a mistake. Some growers who jarred their trees the first two weeks have had a good crop of fine fruit, but where no care at all was taken, the curculio has taken the entire crop, or nearly so. It is not impossible to save the plum crop even here, and if growers would only believe it, the expense of doing so is not great. It is necessary to jar the trees every day, twice if possible, and destroy the insects. The method of jarring is too well known to need repeating. This jarring should be commenced as soon as the blossom is fairly formed, and kept up for two or three weeks. Some contend that it is not necessary to begin until the fruit has formed, but this is a mistake, as the little rascal can be found working or ready for work as early as the first formation of the blossom. In Bruce the curculio has been seen this year in several sections, but has not done much damage. But in Grey growers are not troubled at all. It is delightful to walk through an Owen Sound plum orchard of 1,500 trees and find no trace whatever of the curculio. This state of affairs is too good to last long; the Turk travels slow, but will surely reach that favoured spot. Black knot is as bad as usual, but no worse; it can be found wherever plum trees are. The knife remedy is always the best. Doubtless it is propagated largely through our seedling plums, so plentiful all over this district. It is a common thing to see suckers a few inches high covered with the knot, and instances are known where the knot appears several inches under ground on these suckers. The black knot bill is a dead letter. A good deal of difference in opinion exists among growers as to the best varieties for all purposes. In Grey we find large growers who vary very much. One says he would plant only Coe's Golden Drop and Lombard. Another, who has given thought and experience of many years to the subject, would place them as follows:

1. Yellow Egg.
2. Pond's Seedling.
3. Reine Claude de Bayay.
4. Lombard.
5. Fellenburg.
6. Bingham.
7. Coe's Golden Drop.
8. Washington.
9. Duane's Purple.
10. Victoria.

Another grower would take the following six varieties, for profit, in their order: Pond's Seedling, Yellow Egg, Fellenburg, Lombard, McLaughlin and Coe's Golden Drop. In Huron the Smith's Orleans is a favourite, as it bears young and regularly large crops, and is not so badly attacked by the curculio. Coe's Golden Drop and Washington are favourites also, and the Gages are sought after by preservers for canning. Indeed, the green and light-coloured plums are becoming more popular every year for canning, while most housewives are satisfied with Lombard for the other. General Hand is only worth growing for show purposes; the tree, although handsome and strong, is the worst bearer we have. Bleeker's Gage is very productive. Lawrence's Favourite is a good table fruit. Glass' Seedling, although only second in quality, is valuable; it is generally believed to be identical with the Quackenboss. In Bruce many growers favour Bradshaw, and one near Kincardine says he would plant 2,000 trees equally divided between Yellow Egg, Smith's Orleans and Bradshaw. Others again, who have shipped mostly to the States,

say they would plant no blue or purple plums again, as there is more money in the green and yellow. Jefferson has been held in the front rank by some for many years, and still is a favourite here. The crop this year taken over this district has been about a half of the ordinary yield, and the average price is about \$2 per bushel for the seedlings and blues, and \$2.50 for the green and yellow varieties. The rot that was so disastrous the past three years in the plum orchards has not been seen this season, excepting in a very few instances.

Grapes along the Lake Shore are an abundant crop and samples fine, but more inland, and through Bruce and Grey, the June frost cut back the canes badly, and the crop will be light. Growers are coming to the sensible conclusion that they have been experimenting too much in growing a long list of varieties, and that for actual profit the varieties now grown in the country can be whittled down to a very few. Indeed, this applies to all kinds of fruits. A Huron grower, who has tested almost every new grape in the country, said lately that if he were planting a vineyard for profit he would confine varieties to the Concord, Delaware, and Eumelan. Although we find opinions vary greatly, all growers agree in placing the Concord and Delaware at the head of the list. Doubtless we have none that succeed so well over as large an area as these varieties, and they are always saleable in markets, local or foreign. There is a desire among growers for a white grape equal to the Concord, and opinions differ very much as to the relative values of those now grown. The only one that seems at all likely to fill the bill is the new white grape Niagara, which appears to fully come up to the popular desire as far as we yet know. One grower in Grey would be satisfied with Delaware, Eumelan, Rogers' No. 3, and Hartford Prolific; and another would add Concord, Lindley, Diana Clinton, Salem, and Rogers' No. 15, and then he says he could supply the market with both fruit and wine. These varieties are grown to perfection in that county, and also Creveling, Brighton, Northern Muscadine, Rogers' No. 5, and Burnet. The latter, though ripening a little late, is likely to stand high among varieties in the Owen Sound section. Indeed, that section is capable of producing out-door grapes of any variety popularly grown. Taking the district together, there is no variety grown in the open air in Canada but can be grown here. Some very fine Concords and Delawares are grown in the neighbourhood of Walkerton, and the largest bunches of Hartford Prolific we ever saw were at the Northern Counties Fair at Walkerton. They were grown in the vicinity of Kincardine, on a soil made up of a light sandy loam and a slight trace of clay with limestone subsoil. The bunches were shouldered and so compact that we doubted them, but a taste proved beyond doubt they were the Hartford. We find mildew on many varieties this season. The Burnet is badly affected at Goderich, and occasionally the Salem where it has an eastern exposure; Brant also is badly affected. At Owen Sound, Creveling, Brighton, Salem, and Rogers' No. 5 were affected worse than any others. The rot has not appeared this season in any part of this district, and upon the whole the thrip has not been so bad as last year. At Goderich, the vines can be left all winter upon the trellis without any danger of winter-killing, and growers are only too glad of the chance to do so, it seems; but for the past two years one grower tested the matter thoroughly, and finds it pays well to trim in the fall, and lay down the canes for winter. Last winter he laid down one from each trellis, and left the other up, and the result is that the cane he laid down carries four times the quantity of fruit that the other does in every case. This is the second year he made this test, and now he is convinced that it pays well to trim and lay down in the fall. The Catawba has grown well, and ripened a fine crop of fruit this season at Goderich. Prices from five to eight cents.

Pears.—Although this delicious fruit has been cultivated here for many years, it is evidently only in its infancy. The desire seems to be to get down pear orchards of the best paying varieties. We have never had difficulty in disposing of our pear crop at remunerative prices. The local market is well supplied this year, and a fair overplus for shipment elsewhere. The extra crop in the district finds a market in Toronto and London for early varieties, and Montreal gets nearly all our later kinds. Prices this year are \$1 to \$2 per bushel for early varieties, and late fruit will bring from \$9 to \$14 per barrel, it is expected. The yield this year will be over the average in some parts of the district, but taken all through will not be up to the average. Bartlett still holds

first place for summer, although Clapp's Favourite is growing fast in popularity as growers find its value. If left to ripen on the tree it actually has no value, for by the time it is ripe outside the centre is mealy or rotten; but if picked ten days before ripe, it will keep well, and when ripe is as delicious a pear as anyone could desire—quite sweet enough for the sweetest tooth, more sprightly than the Bartlett, and quite as juicy and melting. For canning purposes a medium-sized Bartlett is hard to beat; Osband's Summer is highly esteemed, and Rosticzer is very good. Doyenne D'Eté is too small to be of value in the market. Taking an average of the opinions of growers in Huron, Bruce, and Grey, we place the list of summer pears that we would grow as follows in order of merit:—

Bartlett,
Clapp's Favourite,
Osband's Summer.

Tyson is also added by a number of growers. Ananas D'Eté has several friends, but it has not been tried generally. Those who have Beurre Giffard speak well of it; but Souvenir du Congrès is not worth growing, or attempting rather, as it succeeds only occasionally. Striking an average again for fall varieties, we have for this district the following:—

Flemish Beauty,
Louise Bonne de Jersey,
Duchesse d'Angouleme,
Sheldon,
Beurre Bosc,
Beurre Hardy.

This list gets the majority vote, but yet we find many fruit-growers of experience give a preference to a Belle Lucrative and Beurre Superfin in place of the two last on the list. It seems cruel to leave Seckel off the list, but growers cannot get price enough for it to make money—they cannot find that high-toned class of consumers who want exquisiteness. Growers complain that many of the winter kinds are lacking sadly in quality, or that the season is too short to properly mature them. Their choice is:

Beurre Clairgeau,
Beurre d'Anjou,
Beurre Diel,
Lawrence,
Oswego Beurre.

Vicar of Winkfield varies greatly and lacks in quality. A prominent pear-grower at Owen Sound, who planted 93 Dwarfs and 21 Standards in 1863 to 1865, has noted his experience from time to time. He would not plant any more Dwarfs, having lost many by breaking off at the graft union, and others were blown over by high winds. He claims that their roots are too small when grafted on quince stock. Speaking of value, he says the Louise Bonne de Jersey bears the most regular and pays best, although the fruit is on the tart side for quality. Bartlett is one of the best. Oswego Beurre is very good, but cracks sometimes and often overbears. He likes Buffam, although some other growers there speak of it as too mealy, tasteless, dry, etc. White Doyenne, good and fair-sized; Glout Morceau is long coming into bearing, and even then of poor quality; the trees are often covered with bloom, and show little fruit. This variety and Beurre Diel and Vicar of Winkfield are his worst for blight. Seckel does not bear well with him. The result of his experience would lead him now to plant only Louise Bonne de Jersey, Flemish Beauty, Bartlett, Brandywine, Beurre Diel, White Doyenne, Beurre de l'Assomption, Tyson, Beurre d'Anjou and Goodale. Generally speaking, he thinks that large pears of inferior varieties sell better than small pears of better quality. Another grower tried pear-growing on light soil, and it proved a failure on account of winter killing and blight, but he claims that since he planted in good strong clay the trees have done well. He has now

Brandywine,
Bartlett,
Madeleine,
Flemish Beauty,
Louise Bonne de Jersey,
Vicar of Winkfield.

This season will be marked among the dark days of pear-growing, on account of the blight; it appears to have attacked all kinds, and to have been especially disastrous on Flemish Beauty and Dearborn's Seedlings, in many cases cutting off entire trees of the former. The knife is still the only remedy we know of that is always reliable. At Goderich some growers who have tried a wash of linseed oil in spring report no blight this season, excepting in one instance on a Dearborn Seedling. Flemish Beauty is not subject to spotting and cracking here as in some districts. Some of the finest samples of pears in this district are found in the rolling clay lands in Bruce. The slug has been unusually plentiful this season on the pear leaves: but the season being so dry, dust has also been plentiful, and a few handfuls thrown over each tree effectually destroyed them.

Apples.—The apple crop has now reached into important proportions among the yearly returns of our crops, and greater attention is being paid to the selection of the best paying varieties, especially those suited to the European market. When orchards were young, and the apple market confined locally, growers vied with each other for the production of the largest number of varieties; agricultural and horticultural societies encouraged this emulation by offering premiums for the largest display. Now, however, these Societies are cutting off the largest collections, and confining more to plates of the finest specimens and small choice selections. The largest apple used to have more weight with judges, in gaining premiums, than any other point; whereas now, actual merit or quality of fruit gains the ruling. Out of 52 reports from leading orchardists in this district, Red Astrachan is placed first in the summer list. The reason most commonly given is, that it can be used both for cooking and eating, and especially that it takes well in the market from its fine appearance. As an eating apple, we find a large majority say it is only deserving of third or fourth place. Some would prefer Early Harvest, while others take Early Joe or Early Strawberry. Benoni has many friends, and so have Pomme Royal and Indian Rare Ripe. Colour, size and form combined do more, probably, to place Red Astrachan in the first place than actual character. As a cooking apple alone, Keswick Collin has no equal. But we have too many early apples; our local markets are glutted almost every season, and prices rule low. This season they are selling throughout the district at from 15 to 50 cents per bushel. We shipped some this season to Sault St. Marie at \$2.10 per barrel, and at other lake ports they brought from \$1.85 to \$2.20 per barrel. It does not pay to ship to Toronto or eastern markets, as the supply there is usually beyond the demand. In order to reach Winnipeg in good condition, we have to pick on the green side and pack carefully. Where the barrels are handled much in transit the loss from shrinkage and (as a Chicago fruit dealer expressed it) mashing is large, so that we do not often venture to ship early varieties so far. Early Strawberry ships well, but it is too small to attract western buyers. Tetofsky is also too small and lacks colour. In Chicago and St. Paul they buy apples by "heft." The quality does not matter so much as a large amount of apples for the money. Quality is actually better appreciated in Winnipeg than Chicago. This whole district is overstocked with fall apples, and their variety is legion. This season the supply is greater than the demand. They are being bought at from 70 to 90 cents per barrel for best kinds, and shipped up the lakes, and to Winnipeg and the Western States. Prices realized range from \$1.90 to \$5.86, the highest prices being obtained in Winnipeg for St. Lawrence, Cayuga Red Streak and Gravenstein; Alexander takes well in Chicago; Duchess of Oldenburg averages well in all the markets; good samples of Maiden's Blush are saleable at fair prices in Michigan; Blenheim Orange is well liked in Winnipeg. Farmers are drying largely of fall fruit this year, and thus the season's crop will be put to good account. Doubtless our great North-West will improve as a market for our overplus of early and fall fruits. The only danger now in shipping there is, that the market is necessarily limited for the want of consumers. Freight is high yet, and will remain so until we

get more direct communication. It costs \$2.07 this season to send a barrel of apples from Goderich, Kincardine or Owen Sound to Winnipeg. Many growers are top-grafting summer and fall apple trees with standard varieties. The Fameuse, or Snow Apple, is shipped often as a fall apple, but oftener as a first of winter, as it brings a better price. Usually the Snow Apple has been spotted, but this season we find it comparatively free and the fruit well coloured.

Our list of winter varieties runs over the most of those cultivated in Ontario, but when we enquire for best value the list is cut down to very few varieties. Northern Spy is esteemed generally worthy of first place on our list. Taking again the fifty-two reports scattered over the district, we find the list of favourites few, compared with the list of varieties grown. It stands thus:—

Northern Spy,
Baldwin,
A. G. Russet,
R. I. Greening,
Ribston Pippin,
Wagener,
Mann Apple,
Fameuse,
Æsopus Spitzenburg,
Swayzie Pomme Grise.

Possibly there is no apple on this list that gives upon the whole less value to the grower than Northern Spy, and yet by a majority vote it gets first place—no doubt on account of excellence of quality. As a tree, it is a clean, thrifty, but not rapid grower, is long in coming into bearing, and when it does is a shy bearer. As age creeps on, it gives a poorer sample of fruit, and should it give a large cover in a season one half is invariably of poor sample. The Greening and Baldwin are reported as tender when young, in the vicinity of Owen Sound. Our crop this season is small, and the export trade will be limited, although good samples and prices will be obtained. Last year the crop was very large and the export trade was extensive. The experience gained by dealing with the mother country gives us the flattering belief that we know more about good apples than they do. Certainly, if we take their judgment from the scale of values given for our apples, it is far from agreeing with our ideas of intrinsic worth. Those who have not shipped to Britain, and contemplate doing so, would do well to select with regard to the rules of value laid down by purchasers in Britain. Our experience has been as follows: It does not pay to ship large apples. They want a medium-sized, high-coloured, well-formed apple; the fruit must be perfectly clean and free from worms. In order to obtain as thorough a test as possible, we shipped last year a few barrels of kinds and sizes obtainable here. The highest price we got was for Green Newton Pippin \$10.63 per barrel, which shows that they do not always judge by colour. Indeed it is hard to understand why this variety should rule so high, and probably we never will know more about it than that it happened to gain notoriety. There is nothing in its character to recommend it specially; indeed, it is oftener placed here as third in quality than higher. It is a hard apple to grow, as it tends greatly to spot. Swayzie Pomme Grise brought \$9.42 and \$10.11; the average Baldwin, \$4.07; R. I. Greening, \$3.86 and \$4; a special lot of the small Baldwins picked from the tops of the trees, whose colour was fine, brought \$9.13, they were labelled "special dessert." Northern Spy averaged \$5.17 for medium-sized fruit, large samples brought only \$3.72; a few barrels of medium-sized Spies specially packed, each apple packed in tissue paper and the barrel padded with brown paper, brought \$8.10; Mann apple brought \$5.54; A. G. Russet, \$4.94 and \$5.30; King of Tompkins County, \$4.56; Ribston Pippin, \$4.28 to \$5.34; Æsopus Spitzenburg, \$5.13; Wagener, \$4.72; Fameuse, \$2.30 to \$3.81; Swaar, \$3; Bourassa, \$6.40; Grimes' Golden, \$3.56; Rambo, \$1.96; Tallman Sweet, \$1.84 to \$2.05; Ben Davis, \$5.77; Roxbury Russet, \$4.57 and \$5; Red Canada, \$4.83; Norton's Melon, \$2.60 (doubtless this was bruised badly in transit); Belmont, \$3.20; Peck's Pleasant, \$3; Yellow Bellflower, \$2.88; Dominie, \$2.60; Blenheim Orange, \$4.81; Fallawater, \$1.83, and Montreal Pomme Grise, \$8.61 to \$9.13.

Our fruit was carefully selected, so as to give only the best of each kind, clean and free from worms. In packing, two layers were first put down carefully, stem end down, and then filled in, shaking the barrel after every basketful was emptied in. The top was finished in the same way as the bottom was commenced, and then pressed down tight, and the *bottom* branded, so that when opened those laid in would appear nice and regular. Where fine samples can be got, it will pay to wrap up in tissue paper and pack carefully, filling all spaces with kiln-dried chaff, and topping off the barrel with a wad of fine swamp hay to press upon. All the fruit was shipped and arrived in Liverpool and Glasgow in good condition, excepting that some were bruised a little. Yellow Bellflower is a very bad shipper on this account: the slightest bruise shows a black spot which unfits it for market. Taking everything into consideration, the Baldwin and Wagener pay better than any two other varieties on the list. Both ship well: they generally average the correct size for the British market, for there they want only a dessert fruit; and the trees come into bearing early and bear regularly large crops. And yet as an eating apple, on the dessert table, we do not look upon Baldwin as unobjectionable. It is a medium or fair apple in January, but kept till March and later it becomes insipid and woody in flavour—indeed at any time the woody coarseness of the Baldwin is noticeable. When it comes down to a matter of excellence of character, our ideal for a dessert apple of this class is *Æsopus Spitzenburg*; there is no discount upon it in intrinsic value; on the value scale we would give it the maximum point. Although Bourassa brought such a good price last year, we would not advise growers to plant it for future value. It is a good apple when taken at maturity, but when kept becomes leathery and loses its fine fruity flavour. At present they do not know apples in Britain, and cannot appreciate high character sufficiently well to give us a scale of prices based largely upon character. As matters are now, we would not fear loss by shipping some fine high-coloured medium-sized seedling of worthless character; it would sell well on account of appearance; but of course it would never pay any shipper to indulge in such trials, as his character would suffer eventually, and his brand be looked upon with much suspicion.

Crab apples are cultivated freely all over the district, and this year's crop is like that of every year—good. There is always an overplus of this fruit which has hitherto gone to waste, or fed to the cattle and hogs. Last year, however, they were shipped to Chicago from Owen Sound and Kincardine, and brought good prices. One shipper at Owen Sound is making ready for a large shipment again this season. *Montreal Beauty*, *Hyslop*, and *Transcendent* are generally preferred for preserving whole, and the *Yellow Siberian* makes fine jelly. Blight affects the *Montreal Beauty*, *Transcendent*, and *Siberian* trees badly this year; in some instances we have seen the main limbs cut down to the trunk. Twig blight has been bad among apple trees, more especially the *R. I. Greening*. The codlin moth has been worse this season than for years, scarcely a *Greening*, *Keswick Codlin*, or *Baldwin* escaping its vigilance in some parts of the district. It is a pity that fruit-growers would not rise in their might and fight all the enemies to fruit culture; larger and finer crops could thus be obtained. But this text has been preached upon until it is threadbare, without effect. The disposition is to plant trees, and afterwards to let them take care of themselves. Growers will look for a crop yearly from an orchard that never gets cultivation or feeding of any kind. This is just the state of affairs that tends to induce disease and insect enemies. Our fruit-bearing trees should be cared for as regularly, with the proper foods necessary in the soil to produce the crop required, as surely as our fields are cultivated and fed to produce each kind of grain and roots.

Forestry will in a few years be one of our most interesting subjects. The original forest in Ontario is fast disappearing, and timber is becoming scarce. This season's fires have done more to force this subject upon the attention of the public than all the writing and discussion hitherto. Farmers are beginning to look at it as a matter of dollars and cents. It is generally conceded that farmers in Ontario cannot long compete with those in the *Prairie Province* in wheat-growing. Our attention must be turned to something else. What will that be? Doubtless fruit-growing will be some day one of the chief features of this Province, and cattle-grazing another. Forestry should be a third, and, when looked into carefully, no doubt but it will. Taken as a matter of crop, it is easily

seen by a rough calculation that large profits can be realized. Take, for example, the larch, which is a rapid grower, and in the course of a few years would be matured sufficiently to make railway ties. The elm also and the ash will grow in ten years large enough to be useful for manufacturing into the parts of implements they are largely used in ; and so on with other kinds. Black walnut is very scarce, and in the course of thirty years would command a very high price, although it would be fit for many uses long before that. Beech, butternut, and cherry also are free growers, and soon mature sufficiently for use. At present there is a fair supply of many woods most commonly used in this district, but it is easily seen that soon that supply must be cut off. Already even the item of firewood is becoming serious, compared to thirty or even ten years ago. We pay \$3 per cord now for a poorer quality of wood than we got thirty years ago for \$1.25 to \$1.50. The subject of forestry commends itself to the serious consideration of the tillers of the soil, and we do hope the subject will be taken up in earnest soon and practically illustrated.

ALEX. McD. ALLAN.

Goderich, September, 1881.

THE WINTER MEETING

was held in the City Hall, Hamilton, on Tuesday and Wednesday, the 19th and 20th of January, 1881. There was a large attendance of members, and much interest manifested in the discussions.

President Dempsey called the meeting to order in a few well-chosen words of cordial salutation. The Secretary read the minutes of previous meetings, which were approved.

MR. P. E. BUCKE presented the Report of the Committee on Fences :—

To the President of the Fruit Growers' Association of Ontario :

Your Committee on Fences, having examined into the subject, have the honour to report—

1. That the existing laws regarding fences are unjust to the landowner and occupier, because if he has no need for a fence around his farm society should not compel him to build one.

2. That if a farmer chooses to "soil" his cattle he should not be compelled to expend on fences a tax, estimated at \$2 per acre per annum, to keep his neighbour's or highway cattle off his property.

3. That no law should compel a land occupier to make a road or division fence to protect himself from the public at large ; that the public are just as much interested in the welfare of the State as are the individuals of the public. These last, therefore, should be protected by a public law compelling individuals to enclose their own stock.

4. That although the public have a right to travel on the roads, they have no right to use said roads for a cattle run or a pasture ground.

5. That every farmer or property owner, either by paying taxes for road construction or repairs, or by the performance of statute labour, have a certain vested right in the roads surrounding his lands ; and in newly-settled townships, or townships being less than half cleared, a majority of owners might say whether the public roads should be used for any other purpose than the legitimate travel, or driving of stock, when required, along them.

6. That during winter these roads are fenced in such a way that they harbour snow-drifts, thus blocking, to a considerable extent, the travel along them.

7. That the maintenance of fences is an excessive burden on the farmer now that timber is becoming scarce and dear, and it behoves the Legislature to make such provisions by law as will assist in doing away with such an oppressive expense.

8. That in the early settlement of this country, when cultivated lands were scarce, and there were no pasture lands for cattle, it was in the interest of individuals to fence in their crops and allow the cattle to run at large ; now the case is different ; the principal

part of the country is cultivated, and the pasture and waste places are in the minority ; these therefore may be fenced, and not the larger tract of farm lands.

9. Therefore, your Committee, taking into consideration the above facts, respectfully suggest that in counties where a majority of the acreage of the soil is arable land, all cattle, horses, pigs, sheep, and geese be prevented by legislative enactment from running at large ; that owners of all kinds of stock should be compelled to keep them enclosed, or pay all damages that may accrue from their depredations ; that it may be the duty of any one finding cattle straying along the roads, streets, or any unfenced lot, when not accompanied by a suitable attendant in such county, to drive the same to pound ; that for every head of cattle so pounded the individual who owns such stock shall pay to the pound keeper, over and above all other fees or charges, the sum of 50 cents per head, to be paid to the individual who puts them in pound ; that all damages to trees by animals be assessed at the full damage done, having in consideration the age of the said trees and the number of years planted ; that such damage be paid by owner of said stock to the owner of said trees ; that suitable attendants be employed when cattle are being driven to market, or from one part of the country to another, so as to keep them from straying off the road ; that any one turning off the road into a neighbouring field, either on foot, in a vehicle, or on horseback, shall be liable to be apprehended as a common trespasser, and as such be amenable to the law in such cases made and provided.

Respectfully submitted,

P. E. BUCKE.

THOS. BEALL.

MR. BEADLE.—There is much in that report that I like ; I think it has the right ring in it. I am glad that our friends who have had charge of that matter have been able to see it in that light. There is one point, however, in regard to which I think the report is deficient. I take the liberty of saying so because I think that the Committee have failed to do as much good as we hoped they would when we put the matter in their hands. They have failed to give us any arguments, any facts, any statistics, or anything of that sort, to back up their report. Now, while I agree with all those articles in the main that they have given us, I think it would contribute very much to the value of that report if, when it goes abroad in our Annual Report, it contained some facts, some estimates, set forth in such a shape that our farmers, when they read them, should understand for themselves that what is stated therein is trustworthy. Now, I do not believe there is one farmer in the section in which I live—and I am pretty well acquainted with them—who has the slightest idea what tax he is paying in the way of fences.

MR. BUCKE.—We state two dollars per annum.

MR. BEADLE.—You state it as a fact, but you do not show it. I should like now, if the matter could be referred back to that Committee, to add to the report some arguments and facts and propositions that would demonstrate the truth of that calculation. I do not doubt or deny them—but what I should like would be this, that each farmer, as he took up that report and read it through, should be led to say, “ Well, now, I had no idea I was paying such an amount of taxes as that to keep up a lot of fences.” In the first place, the farms in our country are cut up, I think, with cross-fences to an absurd degree. I do not think our farmers know what a tax it is upon them to have a field for cattle here, one for sheep there, one for wheat yonder, and another for grass here ; nor what it costs them to have land occupied by fences which they might use for tillage ; nor what the wear and tear of the fences amount to, to say nothing about the first cost. What I would like that report to show would be some facts and arguments by which a man might calculate that so many acres of that farm are occupied by private fences ; what the cost of such a length of fence is on the average ; what its cost if it is a rail fence ; what its cost if it is a post and board fence ; and what its cost is in wear and tear. These are facts that can be got at, and if we are going to influence public opinion so that it will do away with these fences and throw our country open, so that it will look like one grand garden—look more as the country looks in some other parts of the world—we have got to convince the people that it is to their interest that this should be done. If any of the gentlemen here to-day have ever been in the County of Monroe, in the State of New York, or in the

neighbourhood of Geneva—along through that part of western New York—and have seen how much more beautiful the country looks stripped of these rail fences—crops growing right up to the roadside, so that you drive, as it were, right through fields of wheat—I think if they could once see the country looking like that, they would never want to go back to the old rail fences, or fences of any kind. I am told that there farmers have become so thoroughly convinced that it is to their advantage to have these fences all taken away, that those who make a special business of stock-raising and sheep-raising keep temporary hurdles, in which they enclose a piece of ground, and when the animals have eaten the pasture off this they move the hurdles to another place; so that they can keep up their alternations of crop, clover, grass, wheat, corn, etc., while at the same time they have their whole farm to cultivate. All they have to do when they wish to move their hurdles is to throw them on a waggon—they are very light, and are set up again very quickly. I was over last autumn in Cattaraugus County. I had occasion to drive the whole length of it, and I won't say that I did not see a fence—I did—but the people were fast taking them away. Here and there a pretty, substantial fence had been left; but where the fence had got at all rickety it had been taken away. The roadside was almost entirely clear of fences; and I could not help but think, "How beautiful a country this will be to people driving through it a few years hence, when these fences are all gone!" They have planted shade trees along their roads very extensively. I saw acres and acres of vineyards, not a fence about them, coming right up to the road; you seemed to be driving through a vineyard—grapes on the right side and grapes on the left. I would like to see this improvement widely adopted in our own country. I feel that we are behind the age in this matter—our neighbours have got the start of us. I know that if any of the gentlemen present here to-day were looking for a place in which to settle, and went into a country looking like that, it would have a charm for them that this country does not possess. They would give a preference to a country looking like that, in which there is no expense incurred in keeping up fences, but the whole landscape presents the appearance of one grand garden. I do not know whether any confusion ever arises from the want of landmarks; that was the only thought that occurred to me in regard to a possible difficulty in the matter. I move, That the Committee be requested to supplement their valuable report with some arguments and facts going to show why they have come to these conclusions.

MR. A. M. SMITH seconds the motion.

MR. BUCKE.—In the older countries of Europe—in Spain, France, and Italy—very few fences are to be found. I dare say that state of things has existed for a long time—no doubt since the wood has been taken away. I do not think we want to go into this thing quite so minutely as our respected Secretary suggests. I think the thing is so patent to everybody that the report will carry weight in the shape in which it is. The fact of the fences being so expensive is all, I think, that is necessary to be suggested to the public in order to get them to adopt it. The only thing that would, perhaps, assist the change would be a permissive Act, under which the people would not be required to put up fences if they did not wish to have them.

MR. BEALL.—I think the remarks made by our friend Mr. Beadle are quite correct; I believe that much good could be done by taking the step suggested by him.

MR. GILCHRIST.—This matter has been taken up in our own country by the people of the North-West, where they have a law now prohibiting the running at large of cattle. I was conversing with a young man from Pembina lately, and he tells me that people combine in employing a man to take care of their cattle—fences have become so costly there that they have to do that. The expense of a man to take care of the cattle is about fourteen dollars a month. Fencing is an institution we have inherited from the old country, where they occupy a great deal of land that might be made use of for a better purpose.

The motion is put and carried.

QUESTIONS.

1. What new or little known varieties of apples have been introduced, and which of them promise to be of value?

MR. BEALL read the following paper, prefacing it with the remark that it is not strictly in accordance with the letter of the text.

BY WHAT STANDARD SHALL WE TEST NEW VARIETIES?

The first question on the list for consideration is:—"What new or little-known varieties of apples have been introduced, and which of them promise to be of value?"

In the present stage of apple culture in this Province, the latter portion of the question appears to my mind the most important, or rather it would be so if it read, "And which of these promise to be of *greater value* than those now generally cultivated?" for I can see no good result likely to arise from the introduction of new varieties simply because they are new. For unless they excel in some particular some of the kinds already grown, nothing is gained by their introduction. But how are we to compare them? I am not aware that we have any published standard of excellence, either of taste or of commercial value, and I would earnestly recommend the establishment and publication of such a standard without delay, for, in my opinion, this Association could not do any one thing which would more commend itself to the fruit-growers of Ontario, and also to those who desire to grow apples, than to establish such a standard as indicated. Besides those who are at present engaged in apple culture, there are thousands of people throughout our country who are desirous of planting apple trees if they could do so with any reasonable hope of success. But when they see so many of their neighbours who have spent much time and money in apple culture, and who have only succeeded in growing perhaps one tree out of every ten planted, and that one possibly some worthless non-descript variety, it is no wonder such persons abstain from planting. Yet they know that good apples are grown in their vicinity, but when they endeavour to learn the names of the kinds grown by their neighbours so as to obtain trees of the same sort, they are generally as much in the dark as before, because upon enquiry they find that the fruit, although good, does not resemble any of the kinds purchased by the owner. Or possibly his neighbours will give him half a dozen different names for the same variety. Who can be surprised, then, that the anxious enquirer after knowledge respecting apple tree culture should abandon his project in disgust? If such persons could turn to some acknowledged reliable authority, and there ascertain with a fair prospect of certainty what kinds can be successfully grown in their several localities, they would at once send their orders for such trees, and would not feel, as many do at the present time, that to grow sufficient apples, even for the use of their own family, it becomes necessary either to plant and cultivate a large portion of their land as an experimental fruit garden, or to rely entirely upon the veracity and the tender conscience of the ubiquitous tree-peddler.

There can be little doubt, therefore, of the necessity of some plan being adopted whereby the various kinds of apples may be compared with each other, so that the comparative value of any variety may be correctly ascertained for any given locality. A person desirous of planting would then be enabled to know what kinds to plant with a reasonable hope of reward for the labour and means expended. To accomplish this object, I would suggest that a catalogue of all ascertained varieties of apples grown in this Province be prepared, similar to that published by the State Pomological Society of Michigan, but adopting only the headings of the first ten columns and the last one, and substituting for those relating to locality those in the following sheet, and also that such a catalogue be prepared at once and published in the next Annual Report, and also—after a careful yearly revision—in each subsequent Report:—

APPLES - CATALOGUE.

Number.	NAMES.	Description.						Use & Value Scale, 1 to 10.			First year fruiting after setting out.	PRODUCTIVENESS IN PERIODS OF 5 YEARS FROM TIME OF SETTING OUT.				Average price per bushel.	REMARKS.
		Size.	Form.	Colour.	Quality.	Season.	Origin.	Dessert.	Cooking.	Market.		Total quantity got 1st five years.	Average per year for 2nd five years.	Average per year for 3rd five years.	Average per year after 15 years.		
52	Duchess of Oldenburgh	l.	r. o.	y. r.	v. g.	August	Russia.	6	9	10	2nd	1-0	2-0	4-0	.....	cts. 60	Strong, healthy trees.
206	Tetofsky.....	m.	r. o. c.	y.	g.	"	"	5	6	.....	2nd	1-5	2-0	.....	.....	40	Strong, healthy trees.
166	Red Astrachan.....	m. l.	r.	c. y.	g.	"	"	7	9	10	5th	.5	1-0	2-0	.....	75	Fairly healthy.
188	St. Lawrence.....	l.	ob. c.	y. c.	v. g.	Sept., Oct.	Quebec.	8	9	10	6th	...	1-5	3-0	.....	50	Very healthy.
67	Snow.....	m.	r. ob. g.	y. r.	g.	Oct., Dec.	"	9	4	8	5th	.....	2-0	4-0	.....	40	Doubtful.
235	Yellow Bellflower.....	v. l.	o. c.	y. r.	v. g.	Dec., Mar.	N. J.	8	10	9	6th	.....	.5	1-0	.....	60	Very healthy.
79	Golden Russet	m. s.	r. ob.	z. rn.	v. g.	Dec., May	Eng.	8	5	10	5th	.....	2-0	4-0	.....	75	Healthy, but very liable to bark lice.
198	Summer Rose	s.	r.	z. r.	g.	August	N. J.	8	6	6	5th	.....	.5	1-0	.....	65	Not hardy.

It may here be observed that the varieties just named are those which succeed best in the immediate vicinity of Lindsay, with the exception of the Summer Rose, which was inserted to show its low commercial value as compared with others.

Now, to find out if a new variety promises to be valuable in any neighbourhood, the information relating thereto, similar to that contained in one line of this catalogue, will be required; and this information compared with that contained in the catalogue, referring to some apple of the same "season." To illustrate my meaning, we will compare the Yellow Bellflower with the Golden Russet. We find their "season" to be the same—nearly. Both are classed as "very good;" both rated alike for "dessert;" for "cooking" the Bellflower stands 10 and the Russet 5; for "market" they are nearly alike. So far, then, the Bellflower must be preferred. But let us follow the comparison to the end. Both kinds commence to bear about the same time, but neither of them within five years. From the fifth to the tenth year we find the Bellflower credited with half a bushel of fruit per year, while the Russet has averaged two bushels. Then, from the tenth to the fifteenth year the average yearly product of the Bellflower is one bushel, while that of the Russet is four bushels. Now, let us sum up the two lines and see how they compare with each other. We find the trees to be equally healthy; the fruit is equal for "dessert," but the Bellflower is as two to one for "cooking." Their "season" is nearly the same; they commence to bear about the same time. So far, then, there is not much difference between them. But let us see which is the more profitable of the two. At the end of fifteen years from the time of setting out, we find that we have gathered from the Bellflower a total of $7\frac{1}{2}$ bushels of fruit, which may have been sold at 60 cts. per bushel, thus realizing \$4.50, while from the Russet tree we get, for the same period, a total of 30 bushels, at 75 cts., or \$22.50. Therefore, while the Bellflower, from its superior excellence as a dessert and cooking apple, will merit a place in any orchard planted for home use, no one would think of growing it for profit in this locality.

The results may and doubtless can be shown to be very different in different places, but this will only be another proof of desirableness of having some means whereby an authoritative standard for taste, and also for profit, may easily be obtained for the apple for any given locality.

T. B.

MR. BUCKE—I move the thanks of the meeting to Mr. Beall for his excellent paper and more excellent suggestions. I have thought over this matter considerably myself. When reading over the Michigan Pomological Report, I have always thought it was the very thing to adopt in Canada, and I am very much obliged to Mr. Beall for bringing the matter before this meeting the way he has. I have much pleasure in moving "That the thanks of this meeting be tendered to Mr. Beall for his excellent paper, and that it be received and published in our Annual Report."

MR. PETTIT seconded the motion.

MR. BEADLE.—There are some suggestions contained in that paper which come within the province of the Directors to consider and carry out in their discretion; and it strikes me, as a member of this Association, that they should be requested to take them into their consideration. The suggestions are well worthy of it.

THE PRESIDENT—I fully agree with the suggestion.

The motion was carried.

THE PRESIDENT.—Some of these suggestions that Mr. Beall has made remind me of the English system of doing business of that kind. They call it an election of varieties, and they apply it to fruits, flowers, or anything of which they wish to understand what varieties are succeeding best in different sections of the country. In carrying out the plan they simply prepare a list of the varieties grown in the country—the leading varieties, or all of them as they choose. This list is sent to the different persons producing those varieties, and they are authorized to vote on so many of them. In the document there is a column for voting and one for remarks. When all the lists are returned to the Secretary, it is quite an easy matter for him to decide which variety is the most popular among the voters.

MR. BEADLE.—One apple which has been introduced into this country recently, and which I believe is going to take a stand amongst us by-and-by, is a very valuable apple—

and with the introduction of which to general notice this Association had something to do—it is Grimes' Golden Pippin. I find it to be a fact that it will grow in Lindsay to a very great size, and have its flavour very well developed in that climate; and I infer, if it will grow there, that it will grow throughout the larger part of our Province. Although until a short time ago I had not had the pleasure of tasting the fruit as grown in the Lindsay district, I had tasted it as grown in the Niagara district, and had eaten it as grown in London, and in one or two other districts, and had found it a very fine-flavoured apple indeed. We speak of the Newtown Pippin as a very good apple; but I believe if our English cousins got hold of a barrel of Grimes' Golden Pippin, they would soon settle on it in preference to the Newtown Pippin. I think, too, that in its size it suits the want of the English market better than the Newtown Pippin. As I understand it, our English cousins are not particularly fond of a large apple: they prefer an apple of about the average size of Grimes' Golden Pippin. The only thing I can see about that apple which makes me a little doubtful as to how soon it may find its way to the table of the wealthy, and of connoisseurs in Europe, is its want of a bright colour. A ruddy cheek or a skin splashed with red would add very much to its appearance. The Newtown Pippin, however, is quite green-looking when sent to market. There is sometimes a little blush on one side of it, but usually it has very little colour. I believe, therefore, that this apple is going to take a high rank among us. Old members of this Association must have the apple by this time in fruit; for the tree was distributed to them some years ago, and I believe it has proved hardy enough for a large part of the country. From my correspondence with persons in Nova Scotia, I find that it is very highly spoken of as a fruit adapted to that locality, and one which promises to maintain its high flavour.

The PRESIDENT.—Are there any other new varieties that you have tried or seen tested that are promising—the Wealthy, for instance?

MR. BEADLE.—I can merely say that I have seen it. I could not say much of its quality. I believe, however, that the Wealthy apple is going to be a very valuable fruit for extremely cold climates. It seems to be one of the apples that bear the rigours of our northern winter very well. The fruit is of good size and of handsome appearance, and my impression so far is that it is an apple of good quality, not, however, to be compared with Grimes' Golden Pippin. For our extremely cold sections, I consider it an almost invaluable fruit. I have seen and tested the Walbridge, another hardy fruit, that I think favourably of. My impression is that it will not prove to be a long keeper, though I know that the climate in which a fruit is grown has much to do with its length of keep. Grown in our district I would not expect fruit to keep so long as when grown in Lanark, Dundas county, or about Ottawa. While, therefore, I judge that this fruit when grown among us would not keep as long as we would like, yet I think it may turn out that it will keep sufficiently long when grown farther to the north. It is one of the extremely hardy varieties.

MR. HOLTON.—The question as to the value of new varieties of fruits, from different sections of the country, is one of very great importance. What is of great value here in the milder parts, probably would not be of very much value when grown farther north. I cannot say that I have had very much experience with the different hardy varieties. The Walbridge fruited with me this year for the first time. The apples ripened about November; unfortunately they were all stung; but they seemed to me to be apples that would keep well. The average size was about that of a Greening, and the colour one which would probably be very favourably viewed in the market. As to their flavour I can say nothing. An apple that I have had fruiting with me for a number of years, and which I look upon as a very valuable sort for the milder portions of Canada, is the Ohio Nonpareil. It is not perhaps a very new apple, but is new here. I have never seen it at any of our exhibitions; it is an apple that resembles the Gravenstein; it ripens about the 1st of November. The tree is a strong, vigorous grower—evidently will make a large orchard tree wherever the climate will allow it to stand without injury. I have no doubt the apple will be a very valuable one. I have known Grimes' Golden for many years, and I know no other apple better adapted to dessert or family use than it. There is one drawback to it, however, and that is the habit of shrivelling a good deal. It may be that my cellar is not perhaps cool enough, or I may have got them picked rather early; I cannot

say that the defect is inherent in the fruit. If this objection can be removed, and if it was only owing to my method of keeping the fruit, that should be known, because if the apple can be kept firm it is certainly a very valuable one.

The PRESIDENT.—About what is the temperature of your cellar?

MR. HOLTON.—It is about 40°.

MR. GILCHRIST.—I think it is well to know if any apples imported from England or Scotland do not succeed as well as our native apples. My brother sent me some scions from Scotland, and I have fruited one, the Sutherland. It is very prolific, and mine grew the second year from the graft. It is an inferior apple; as far as I have tasted it, I think it is unworthy of cultivation. I have given grafts to several people in the neighbourhood, and they have all said it is unworthy. It cooks well enough; but it has no quality.

MR. CROIL.—Any apple that would bear well on the Clyde ought to bear trebly well here; for my experience there was that the trees looked very miserable and very unhealthy, all moss-covered and stunted, and no crop on them. The Mackintosh Red is grown in our neighbourhood. I have a great many trees planted, but they have not borne much; the tree is well spoken of, however. I see that in Hoskins' last Montreal report it is compared with the Wealthy, and the preference is given to the Mackintosh. I have seen the original tree; they call it seventy years old, and it is still bearing, and I think myself the apple is good. I brought it up here three years ago, and it was set down as third-class. We were quite content with that, because an apple that would pass here as third-class we would place first-class—we are not able to grow as good apples as you.

MR. BEALL.—Is it an early bearer?

MR. CROIL.—No, I cannot say that it is—not in my own experience; but it is a regular bearer, I believe, and very hardy; a good keeper; in season I suppose till March.

MR. BUCKE.—I got the Grimes' Golden from the Association some years ago; but, although it has grown very well, it has never borne. I, however, grafted a tree from it, and from that I have had three crops. The tree is not a very large one. My apples are the same shape and size as a Grimes' Golden Pippin which I have seen exhibited here to-day, but quite russet; I was astonished to see the apple shown here so smooth in the skin; I cannot understand mine being so different, because the tree came from the Association; the colour is more golden than that of the apple shown here. I think, perhaps, there may be some mistake.

MR. BEADLE.—A little while ago I said that our cousins in England wanted medium-sized fruit; in order to support my position in that respect I will read what is quoted in the *Canadian Horticulturist*, page 160, as having been said by Mr. Cochrane, a large dealer in Liverpool, in his apple circular, which he has been sending to me regularly. Under date of October 9th he says, "Small, handsome fruit is preferred to large, and meets the want of a better class of buyers"—meaning men who will pay more for their apples.

MR. GILCHRIST.—I may state that in the old country apples are principally sold by the pound for using on the table, and that is the reason they want a showy, medium-sized apple. We know that we can better make a pound of medium-sized than of large-sized apples, and a showy apple we can sell better than a large. The showy apple always has the preference in the English market.

MR. HOLTON.—I have had a tree in bearing for three or four years which it may be interesting to people farther north to hear about—I mean the Haas. The fruit has a very high colour, and is a handsome flat apple of good size, as large as a Baldwin probably, but rather flatter. Perhaps at the north it might be considered of great value. It is a free grower, and bears young; but in our neighbourhood here, where we can grow almost all of the high flavours, I should not esteem it so highly for its flavour as some others. Pewaukee, Wealthy, Walbridge, and that class of hardy sorts, where they can be grown, are high-flavoured apples.

MR. BEADLE.—I have been eating the Haas quite freely this last week or two, and I am inclined to call that a pretty good apple; it is certainly a rich apple as it grows in our neighbourhood. These apples that I have been eating did not grow on my own place; one of my neighbours, who only lives a couple of miles from me, whose soil is a clay

loam, brought them to me. They are tart, but mild in flavour; the colour of the flesh is greenish, the juiciness of the apple is fair; I have seen fruit more juicy, but it is not a dry apple. I certainly would rank it almost very good; not best—there are very few apples that come up to best, to take the ordinary pomological rate of ranking—good, very good, best. This apple certainly appears to me to be a little better than what we call good. If it will hold that flavour generally—not only in the northerly, but in the more moderate climates of the Province—I believe that apple will prove to be a very valuable fruit. It appears to keep quite firm; these that I was eating were ripe, but they had been kept in a warm cellar; if they had been kept in a cool cellar they would have been too hard for eating. These apples would keep till spring; they are very handsomely mottled, and striped with red on a yellow ground; the shaded side, when the fruit ripens up, becomes a beautiful golden yellow. I am told the tree is a hardy one, though not the hardiest; of course, in Lincoln county we cannot apply the test of hardness; I see that in the Minnesota reports they say it is not the hardiest. It cannot be planted in every locality; they have only one that can be planted everywhere, and that is the Duchess of Oldenburg. The Haas apple will, I believe, take a good place in the market.

MR. ARNOLD read the following paper on

NEW VARIETIES OF APPLES.

“Amongst the comparatively new and promising varieties of apples I would place Cox’s Orange Pippin first. The tree is hardy, a moderate grower, an excellent bearer, and the finest flavour of all dessert apples; good from October to January. Second, in my opinion, is Swayzie Pomme Grise. The tree is very hardy, and a good, strong, thrifty grower, a good moderate bearer, and with good cultivation grows to a good size for a dessert apple. The flavour is excellent, and in the opinion of many people its peculiar crispness and juiciness make it equal to Cox. Third on the list for a dessert apple is Arnold’s Beauty. The tree is the best grower of any tree I ever grew in the nursery, and though many people would not consider it equal in flavour to the two above-named varieties, all would admit that in appearance it is quite superior. The tree is so perfectly hardy, and such a constant and heavy bearer, that many would call it the best of all because it would pay the best. Fourth—As an apple for general cultivation and uses, especially for apple pies, I know of no apple superior to Ontario. Its large and uniform size and smoothness will always make it a great favourite in the kitchen, and its annual bearing all over the tree must make it a favourite with the orchardist. The following apples, although not equal to the above varieties, are quite superior to Baldwin and many other old varieties, viz., Grimes’ Golden, Dora, Benoni, Ella, Pomme Royal, Moyle, Centennial Russet, and one large, sweet russet not yet named.”

He said:—I find, in deciding the question of best, that it is generally the apple that pays the best which is considered the best; it is not the one that is the best flavoured, otherwise the Baldwin would have been kicked out of existence years ago.

MR. BEALL.—The Cox’s Orange Pippin, although it may not be considered by some people here a good apple, is accounted in England the *ne plus ultra* of an apple.

THE PRESIDENT.—I have no hesitation in saying I believe it to be the best apple I ever tasted.

MR. ARNOLD.—I never heard two opinions as to the flavour of it; everybody always pronounces it the best. I sent some of them to a friend of mine in London; he said that his children would eat no others while they lasted, and children are usually good judges of apples.

MR. MORRIS.—Of the trees that I have fruited, I think I would place the Wealthy, among the new apples, as the best for Canada; it has many good qualities. In Michigan it is very well thought of. It is an enormous bearer, and yields even when two years old. It is an apple very similar in character to the Fameuse. The Fameuse is another of the new ones that I could recommend. I am speaking now of apples that would class as good in our mild sections; but I think it would pay to plant these in any section. Another one that I would mention would be the Walbridge, a splendid growing tree, with a fine, large red apple—a thorough winter apple. There is another apple called the Stump.

MR. BEADLE.—That is a Western New York apple.

MR. MORRIS.—Yes. It is similar in appearance and quality to the Sherwood Pippin. I can endorse what has been said about the Haas.

A MEMBER.—Do you fruit all these varieties?

MR. MORRIS.—Yes.

MR. SMITH.—There is another apple that has been recommended by our cousins across the line, which, though not exactly a new apple, I would refer to. I see it now classed by them among their "Ironclads," as they call them—that is, apples which are recommended for their northern climate. We here would not call it a very good apple, although it is a very good keeper; it is called the Mann apple. Some call it the Spring Swaar; it resembles the Swaar in appearance somewhat; it keeps nearly as long as the Roxbury Russet; it is a very good keeper, a good bearer, and is said to be adapted to sections where we cannot grow the Baldwin and Roxbury Russet. If it is as hardy as they claim it is, I think it is a very good apple.

The PRESIDENT.—I am proud that we have among us to-day at least one fruit-grower from the United States. I have great pleasure in introducing to you Mr. Woodward, of Lockport.

MR. WOODWARD.—We in Western New York do not go very much on new apples; we stick to the old stand-bys that bring us the money. This apple that Mr. Smith speaks of is not to us a new apple; it was brought into the county where I live from Oswego County by a man named Mann. It is an apple that has never been appreciated. It is, however, free from the attack of the codlin moth. It is not a very rapid-growing tree, but it bears very large crops, though it seldom bears every year—it bears every other year. The apples are about the size of a middling-large Greening, which it resembles. It will keep better than a Russet, and has been raised as a cooking apple. It is perhaps as good an eating apple as some others. I have seen the Stump apple, and it is a good one; it ripens about the same time as the Gravenstein; I have never grown it.

MR. BEADLE.—Would the Mann be a profitable one to raise in Western New York?

MR. WOODWARD.—Yes.

MR. BEADLE.—I may state with regard to the Mann apple that it is one of those varieties that begin to bear very early. It often bears in the nursery. But I have never had an opportunity to form an estimate of it. It is not a tart apple; it is almost sweet—not quite sweet. Now, that is an apple that is not to my taste; I like a decided apple. It will keep as long as Mr. Woodward says, and a little longer; I have seen it in July in pretty sound condition. If the tree is as hardy as Mr. Smith says it is, it may prove to be a pretty valuable apple in our northern sections; but it never occurred to me that it would be very well adapted to those sections. There is no beauty in the apple to attract a buyer if sent to market. It looks about as much like a Greening as anything else at the time of the year when apples are marketed, and then when it gets ripe it hardly gets yellow.

MR. WOODWARD.—I never heard it classed, with us, anywhere, as a sweet apple. It is too sour for an eating apple. I would not place it as high as a Greening; but it is the best of the late keepers. It is very tart, and my experience of it is that it is a better cooking apple than any of the Russet class. It is not an attractive apple; it never gets golden in colour; it is like a dull Greening always. It is only valuable as a very late keeper, and in localities where better apples do not succeed so well.

MR. HOLTON.—There is another apple that I would like to mention, a western apple that I have fruited, which, as far as the flavour is concerned, seems to me to be very valuable; that is the Perry Russet. It comes from some part in the west. Though resembling somewhat the Roxbury Russet, it has not a great amount of russet on it. It is a very spicy, nice-flavoured apple, about the size of the Greening. I have only had it top-grafted; if there is any objection to it, it is that it seems to me to be a wretchedly poor bearer.

The PRESIDENT.—I have tested a very large number of new varieties. In 1871 and 1872 I imported largely of Russian, German, French, English, Irish and Scotch varieties of apples, and out of the whole of them I found no early apple at all equal to the Grand Sultan, a Russian apple that matures with our Early Harvest. I grafted the two on the

same tree, and found them maturing together. The Grand Sultan will yield two bushels to one of the Early Harvest. It is not so good an apple; but it is equal to the Red Astrachan. It is conical in form, a whitish yellow apple, splashed and striped with red, making it a very pretty fruit, looking almost like wax. It produces a full crop every year, the tree bending under its load of fruit. Another variety is the Grand Duke Constantine. I was considerably disappointed with this apple, although the English people recommended it very highly. I have never yet seen anything in the form of an apple so pretty; but it is exceedingly difficult to grow here. The ends of the branches freeze during the winter, and then decay. It is a very slow-growing tree. The next variety is an English apple called the Cellini, a very pretty apple, conical in form, considerably above medium size—I may safely say prettier than any other apple of its season. It is a little later than the Duchess of Oldenburg. It is a keeping apple. To my taste it is a very fine fruit. The tree is pretty hardy; a good fair grower—rather a pretty grower, and very prolific. Next in turn would come Cox's Orange Pippin. With me it is an alternate bearer. The fruit hangs down on the branches, something like strings of onions braided up; and when we come to select the apples for market, we find nothing to reject. They are almost uniform in size. They run the evenest of any apple I have ever cultivated yet. These would be the main varieties of I do not know how many that I have tried, but a great many varieties at all events. They are the only varieties I have tried which are worthy of cultivation.

MR. ARNOLD.—Are you placing these apples in their order of merit?

THE PRESIDENT.—No; order in regard to maturing. There is another apple that I should have spoken of, that is, the Sturmer Pippin, an English apple. It is a yellow fruit, rather flattish, with a greenish brown cheek to it, about the size of an ordinary Roxbury Russet, and about the shape of it. It will keep almost any length of time. They claim in England that it will keep two years. At all events, we have no difficulty in keeping it till July. It has a sharp, clear, acid flavour. In the summer, when it is hot, that is an apple a person would relish; but at this season of the year you would not want to taste it a second time.

MR. MORRIS.—There is an apple grown in our township which I do not think I have seen grown in any other section. I believe it is a local apple which was first put out by a small nurseryman there, Mr. Taylor, who was in the habit of picking up seedlings and cultivating them, and this one turned out to be very valuable. In our section we think there is more money in it than in any other apple grown there. It bears a heavy crop every year right along, and lately—during, probably, the last six or eight years—it has brought a higher price than any other apple among us, although in quality it is ranked as second or third-rate. The demand for it is caused by its superior shipping and long-keeping qualities. Montreal buyers claim it will ship to hot countries and stand longer voyages than any other apple they can get. Many of them are anxious to purchase the crops of this apple for years in advance, while those who have it will hold it back and sell their other fruit first. It goes by the name of the American Pippin.

A MEMBER.—I would ask Mr. Morris if it is not a nearly sweet apple?

MR. MORRIS.—Yes.

MR. BUCKE.—We have had a Russet before us several years; perhaps Mr. Holton may know something about it.

MR. HOLTON.—It is a Russet introduced by Mr. Bragg, I think. I have seen the apple, but I have had no experience of its keeping qualities. He is always representing it to me, however, as a long-keeping apple. I think it is about as large as the Roxbury Russet. I cannot speak myself as to the quality of the fruit. There was a committee appointed, I think, to examine and report on that apple.

MR. ARNOLD.—Mr. President, do you remember an apple exhibited at Philadelphia, a Russet apple which was awarded a medal, which came from the London District, and was named by some, "The Centennial Russet?" I think it was Mr. Saunders sent me some grafts of it, and from my experience of one year's fruit, I have no hesitation in saying it is one of the finest apples I ever saw. It fruited the first year. I had not many of them. It has a fine ruddy cheek.

THE PRESIDENT.—I do not remember it. We have quite a number of native seedling

apples that promise to succeed well; but there are other superior varieties already in cultivation that come at the same time, and I would not think it wisdom to multiply the varieties.

MR. BEADLE.—Respecting those apples whose names have been mentioned to-day, I think that for commercial purposes no person would need more than half a dozen, or about that number, of varieties. Now, I should like to know which half-dozen of those that have been mentioned I ought to grow, and which of those that I am growing I ought to abandon. I cannot see the necessity of introducing new apples if they are not superior to the older varieties.

The PRESIDENT.—I do not understand that the intention, in the discussion of this subject, is the introduction of new varieties. We are considering it simply in order that we may have an opportunity of exchanging experiences, and by that means be able to arrive at some idea as to what kinds are most likely to succeed in different sections of the country.

MR. ARNOLD.—That is a matter of opinion. The Baldwin is a good shipping apple, and a good keeping apple; but there are many better, and it is unlikely that it will ever come into constant use. Even Grimes' Golden would not succeed with everybody; but if they would succeed with everybody as they do with me, I am satisfied everybody would get a tree of that variety for the use of his own family, if for nothing else. Cox's Orange Pippin is a favourite apple in England; everybody there praises it.

The meeting adjourned till half past one, when

MR. ARNOLD read a paper on

NEW OR LITTLE KNOWN VARIETIES OF PEARS.

The most promising of all the new pears that I know of is the Goodale. This pear originated in the State of Maine. The tree is a very thrifty, upright grower, and, I am inclined to think, more hardy than any other good pear. The fruit is very large and beautiful, and the flavour is very good, and with me there is a good crop of fruit every year; its season of ripening is last of September to 1st of November. It is a much better shipping and keeping pear than the Bartlett. The only other new and valuable pear that I shall mention is Negley. This variety is an excellent grower, and quite hardy on pear or quince stock. A good bearer, and, in my opinion, the most beautiful pear grown. Season of ripening, September.

MR. WOODWARD.—You would not call the Goodale a new variety of pear, would you?

MR. ARNOLD.—Our subject is "New or Little Known Varieties." I do not know of any newer. I think it would be called a new or little known variety. The fruit has not been exhibited more than two years in Canada to my knowledge.

The PRESIDENT.—I do not remember seeing it at our exhibitions until last year.

MR. BEADLE.—It has been in the country, I suppose, ten years, and yet I do not believe there are a hundred people who have fruited it.

MR. ARNOLD.—I do not think you could say a hundred.

MR. HIRAM SMITH.—I fruited the Goodale this year, and am very much pleased with it, the first year of fruiting. I have fruited the Brockworth Park three or four years, and it has disappointed me; it resembles the Bartlett—it is not so large, but is a very sweet pear. I see there is great doubt expressed on the other side about it being a new variety. The tree is peculiar in having a very rough bark; it is hardy—almost every pear is hardy with us here.

MR. ARNOLD.—It is the most tender pear I have ever had anything to do with; it kills down to the ground almost every winter.

MR. BUCKE.—The Beurre d'Anjou pear was sent out by the Fruit Growers' Association, I think, some six years ago. My tree is alive, but it has never borne, and I never expect it to bear. I have several pear trees living, but I have never had a pear on them, and never expect to.

MR. MORRIS.—I have had one about six years called the President Drouard, a winter pear, and I would recommend it particularly for its freedom from blight and the good quality of the pear as well. During that time I have not seen insects or blight, either on the leaf or the tree, while even the Duchess alongside of it has shown signs of blight. It is

the least subject to blight of any pear tree I have grown, unless it is the Kieffer's Hybrid—of course I have not had that long enough to judge.

MR. WOODWARD.—I grow only the Duchess, and I do not experiment very much with the new varieties. The Goodale pear I am very much pleased with. I had the pleasure of meeting Mr. Goodale this winter, and talking with him; he is not the originator of that pear, I believe, but the disseminator—that is the way it came by his name. It bears a very good reputation in Maine, and is grown in large quantities there; perhaps there is no pear in Maine that their open market is more fully supplied with than the Goodale, and it brings a very good price. In New York we like it very much.

THE PRESIDENT.—I do not understand that you are trying new fruits.

MR. WOODWARD.—No; I am growing fruit for money, and when you are growing fruit for money you cannot experiment very much. I do not live on my farm myself; I have my nephew on it, and it is about all he can do to look after the general farm and the old-established fruits. We do experiment on one sometimes.

MR. BEALL.—I was foolish enough some eight or ten years ago to experiment with perhaps thirty varieties of pears, and every variety failed with me except the Flemish Beauty; that, I am glad to say, succeeds well—so much so, that I have at present perhaps twenty-five or thirty trees, and expect to have more. In the neighbourhood in which I live the Clapp's Favourite is doing, I think, just as well, and will succeed just as well.

MR. A. M. SMITH.—I do not know anything about new pears, but I have some twenty-two different kinds of that fruit. This last spring there was a late frost, which had the effect of killing two of my trees—that is, the tops of them; one was Clapp's Favourite, and the other was the Sheldon. So far as Bartlett is concerned, we have lost several of them with the blight; all the rest of the trees have escaped. As for the Flemish Beauty, I have never seen the blight or anything else touch it yet. All the trees of that variety have done exceedingly well; the two that I have mentioned are the only ones I had any trouble with, and I am certain that in those cases the difficulty was owing to the late frost just at the time they were budding.

MR. BUCKE.—The Flemish Beauty at the Asylum at London is still free from blight, although almost all the other trees have been touched with it.

THE PRESIDENT.—I have attempted to fruit more pears than I have ever fruited. A few years ago I imported 200 varieties of pears, and I would have felt very thankful if I had succeeded in getting ten out of them. I have fruited the Souvenir du Congrès, but the tree is so tender we cannot depend on it. I have also fruited the Beurre de l'Assomption, and it is likewise tender. In fact, that has been the case with every variety we have imported from France. A large list of Andre Leroy's varieties which I imported were perfect failures; they would not stand our climate at all. We imported a few varieties from Belgium, among the rest the General Todleben, which is a very fine pear, and has a very fine shape also, only it looks as if it had a suture down the side; the stem is an enormous length, sometimes three inches. The pear ripens in the end of November or the beginning of December, and it appears to be prolific. Most of our new pears have just proved perfect failures. The Brockworth Park is with me perfectly tender; it has frozen every winter almost since I have been trying to grow it; I could not recommend anybody to experiment with it. Indeed, there is scarcely any new variety of pear that I would recommend. As I have said before, there are only three or four varieties of pears that I consider worthy of cultivation in Canada, and the Flemish Beauty is one of the first ones I would cull out. Judging from my experience at home, I would place Clapp's Favourite on the hardy list.

A MEMBER.—Would you please tell us the three or four varieties you would prefer?

THE PRESIDENT.—Of course there is quite a difference between the climate of Grimsby and that of the County of Prince Edward. However, if I was going to make a selection to-morrow of pears to plant for my own use, I would take Manning's Elizabeth, Clapp's Favourite, Beurre Hardy, and the Josephine de Malines. If I wanted to plant for market, I think I would be satisfied with the Clapp's Favourite, Bartlett, and De Malines.

MR. BEADLE.—The pears which I have been fruiting would hardly be called recent introductions; they were brought into America some time ago, though they are not

generally disseminated in Canada. For instance, the Brockworth Park pear, I have fruited it, and I think it is an old pear revived with a new name, like the Beaconsfield grape. I forget at this moment the true name of the Brockworth pear; but I have become satisfied, after seeing the fruit, examining it, and comparing it, that it is a fruit we knew under another name. The *Souvenir du Congres* is a large, handsome pear, shaped not unlike a Bartlett, not unlike a Bartlett in its appearance generally, ripening about the same time—sometimes a little before, sometimes a little after. I have hardly been able to make up my mind whether it comes before it or after it; some seasons I thought it was ripening after the Bartlett. Perhaps, taking it on the whole, it does ripen a little after the Bartlett; but when you come to talk about its quality, I am a little like Mr. Holton—I am not prepared to say very much about it; my impression, however, is that it is not as good a pear in quality as the Bartlett. It is a very showy fruit, and I have seen larger specimens of the *Souvenir du Congres* than I have ever seen of the Bartlett. The Goodale also, though an old pear, is not very much disseminated in Canada. I have fruited it very many years, and I like that pear very much. It is a juicy, sprightly fruit, ripening late—ripening in October, after the rush of autumn fruits is somewhat over. A fault that it may be said to have is that it is not very attractive in its appearance; there is not much redness of cheek to it; it still retains a kind of greenish hue when it is ripe. I like the flavour of it very much; it is not one of the highest-flavoured pears—not like a Seckel or a *Beurre Bosc*—yet it is a good flavoured pear. The fruit is very uniform in size. Of course, my trees are small yet, but so far the fruit is of a good size. It is a very fair cropper; it begins to bear young—not so soon as the Bartlett, but very shortly afterwards. I believe the tree to be very hardy. It was originated in Maine, and so far as the reports have come in to me from the members of the Association that have been trying it, they are very favourable to it in regard to this particular of hardiness. I have been trying the Mount Vernon, which was introduced a good while ago, but I have not fruited it yet. I think the President has tried it. An accident befel my tree, and I had to start again. I have also fruited the *Josephine de Malines*, but I have lost my tree now. I like that pear; it is not a very new pear, but I doubt whether there are fifty trees of its variety bearing in Canada. I think it is the best winter pear we have in point of flavour. Many of our so-called winter pears are made so by keeping them just about freezing in the cellar, so that we can manage to hold on to them till January. I made the remark some years ago that I had not seen a real winter pear that was worth much more than a turnip, and Mr. Barry handed me one of those pears and said, “I think you will consider that better than a turnip;” and after seeing it for several years, and testing it, I do consider it better. Winter pears are very variable in their quality. I will get some very fine-looking specimens—for instance, of the *Vicar*—but when they get ripe they have no taste. My friend, Mr. Arnold, once handed me a *Vicar* pear and said, “Taste that; you won’t think that is a turnip.” I tasted it, and I turned round to Mr. Arnold and said, “I wish you would give me a pail or a barrel of them, and I would eat them.” The next year I asked Mr. Arnold, “Have you brought down any of those *Vicars*?” He said, “Oh, you must be content with those; you do not get such *Vicars* as those more than once in a lifetime:” and that is my experience. At present I would say the *Josephine de Malines* is the best winter pear we have. The Mount Vernon is supposed to be a winter pear, but I cannot make a winter pear out of it. The *Beurre d’Anjou* is another winter pear which I cannot make a winter pear of. The *Beurre Diel* is another winter pear, but I cannot make a winter pear of it. However, my soil is not, I think, the soil for winter pears; it is too sandy for pears; I think if it was a stronger soil it would be better. The *Beurre d’Aremberg* is an old pear which I cannot grow to satisfaction on my soil, and yet I have seen some fine samples of it exhibited at our winter meetings.

THE PRESIDENT.—Have any of you ever fruited the *Duchess of Bordeaux*?

MR. ARNOLD.—I have fruited it, and I once spoke very highly of it, but I take this opportunity of changing my mind. I saw about half a peck of them in my cellar yesterday, and they are not fit to eat—they are withered up. I think they might do farther south. I never yet saw a man grow winter pears but his soil was too sandy or too something else. I think that any man who makes up his mind to grow winter pears for market should also make up his mind to take a great many scoldings. I was coming to a

winter meeting some years ago with some Vicar pears; one or two gentlemen said, on trying them, "That is a very fine pear;" and I saw one or two more running to the door and spitting; said they, "Call that a pear? It is worse than any turnip I ever tasted." There is no winter pear that I think reliable but the Winter Nelis.

THE PRESIDENT.—I hope no person will be discouraged by the remarks that have been made in reference to winter pears. The Josephine de Malines is growing with me just as well as a Greening apple, and it keeps just as well. The Duchess de Bordeaux is doing with me about as it does with Mr. Arnold—it gets to about half its size, and shrivels up; it will attain about the size of a Russet apple, with a long stem to it, and in a short time it shrivels up. The Mount Vernon succeeds well with me.

MR. CROIL.—No pears succeed very well with us. I have tried the Flemish Beauty, but it does not amount to anything.

MR. BIGGAR.—There are very few varieties that I grow. I find that Clapp's Favourite is about as good a pear as I have, with the exception of the Flemish Beauty, but they are very apt to blight on light sandy soil.

THE PRESIDENT.—Does the Flemish Beauty blight?

MR. BIGGAR.—It has not as yet, but I expect it will this season.

THE PRESIDENT.—Perhaps it would be as well to tell you that the lowest figure I was ever offered for Josephine de Malines pears was \$6 a bushel, and I can grow them as well as I can the Flemish Beauty. I will suggest that each of you might grow a tree of that variety, and see how you succeed with it. I top-grafted all my trees at first, and then condemned them; but now I have changed them back again. I double-worked my trees on pear tops. I did that because I made a mistake at first, and wanted to work them back again.

MR. ARNOLD.—The Souvenir du Congres is with me a total failure in the nursery, but in one instance in which I grafted it on an old, worthless pear tree, it has in a measure succeeded.

BEST METHOD OF PUTTING UP FRUITS.

MR. A. M. SMITH reads a paper on this subject:—

"One would be inclined to think that the Association had already discussed this subject till it was exhausted, when we remember the number of times it has been before us. But should we visit most any of our markets in fruit time, and see the way fruits are brought in, strawberries and other small fruits for instance, in pails and pans (ready for jam, with the extraction of a little dirt and the addition of a little sugar), peaches and plums in boxes and barrels, apples and pears in meal bags—not particularly well shaken (the bags I mean, no such imputation would apply to the fruit, as the numerous bruises would testify)—we should come to the conclusion that there was a necessity for a little more discussion or missionary work, or something of the kind, in this direction. If men are so blind that they can't see the difference between getting 40 cents a bag for their apples shook from the trees and carried to market in bags, and 50 to 75 cents per half bushel for good, hand-picked fruit, in good, clean baskets, or \$2 to \$3 per barrel, I think it the duty of the Society to send out a missionary to enlighten them. But to come to the question: the best way of putting up fruits for the market. This depends upon the object you have in view—whether it is to make the most you can out of your present crop, without regard to the satisfaction of your customers or your reputation for the future, or to give satisfaction to your customers and your own conscience, and establish a reputation that will be of use to you hereafter. If the former object is your aim, in the first place get the cheapest packages you can, as near like ordinary ones as you can, and have them hold as much less as possible and look like them; this you can do by giving special orders to the manufacturers. Then put in all your fruit—good, bad, and indifferent—don't lose any of it—but be sure you get the good fruit on top of the packages, put the best side up and make it look beautiful—buyers will think it alike all the way through, especially if they have been dealing with honest men. In putting into barrels, have good fruit in both ends, as some folks look at both ends when buying—you can put all the poor stuff in the middle of the barrel. If you are not likely to have fruit

enough, put in a pumpkin or two, or a few turnips, to fill up—they will be useful to the buyer, and he will never know who did it, and it will be likely to go to the old country. Don't put your name on, and you are safe. This course, carefully pursued, may insure you the most money for the first crop, providing you didn't happen to sell to the same party twice. In that case you could go to some other market where you were not known. But if your object is to satisfy your customers by giving them a good article, and establish a reputation for fair dealing and good fruit, I would recommend the following course: Get the very best packages of the different kinds wanted, and if you get quart baskets for berries and small fruits, have them hold as near two pints as possible; and if you get an order for half a bushel of plums or peaches, don't try to put them in a twelve-quart basket; or, if you are ordering barrels to be made for apples, don't tell the cooper to cut the staves a little shorter than for flour barrels, or to draw in the bilge a little; and when you put in your fruit don't put it in unsorted, just as it comes from the tree. Some of the gnarled and wormy specimens won't hurt the pigs; and if you make two classes after you pick them out they will sell for more than enough to pay for the trouble of sorting, and when you put them in your packages don't put all the best on top, but have it uniform throughout, and then you need not be afraid to put your name on it, or offer it to a man the second time. Pursue this course from year to year, and you will never fail to find customers for your fruit at a fair price."

Mr. BEALL moves, seconded by Mr. BIGGAR, that Mr. Smith's paper be received for publication.—*Carried.*

Mr. BUCKE.—I have had some little to do with having some fruit brought down to Ottawa this fall, and what I am about to state I know to be a fact. It was shipped by some people about Grimsby. Before it was sent it was seen on the trees by the person who consigned it to Ottawa, and he was perfectly satisfied with it—he said it was beautiful fruit, and he made arrangements to get his winter stock there—some 800 barrels, I think. The fruit was put up all right; but unfortunately the shippers, it appears, instead of loading it on to the steamer in a proper cradle, so as to have it put on board nicely, without jarring, sent it down a slide of about 20 feet, and the consequence was that the heads came out of some of the barrels, the apples were very much shaken, and when they got to Ottawa, the man who had thought that he had made such a good bargain, opened the barrels to find that the apples were all bruised. Some, however, that had been deck loaded, came to hand in most beautiful condition. Now, the parties who sold these apples put them up well, and this agent expected to have them come down in good condition; but here was an irresponsible party, the shipper, afterwards destroying them almost. I think there ought to be some hold on these shippers, or that something should be done to prevent good fruit being wasted by them.

Mr. A. M. SMITH.—That is a very important question, and one which might be brought up under the head of miscellaneous business. There has been considerable complaint this year about the way that fruit has been handled both by express companies and by railways and steamboats.

Mr. ARNOLD.—I have seen a great many hand-picking apples; and yet the same men put them into baskets, and you will see them pouring them from the top of the barrel into the bottom. Now, what is the use of taking so much pains in picking them if you are going to pitch them into the barrels in that way? Then again, men often send their apples two or three miles to a railway station in a lumber waggon, over a rough gravel road. No matter how well apples may be picked, that will injure them.

Mr. PETTIT.—We have found a little difficulty this year in shipping. There was a large quantity of fruit shipped from Grimsby, and arrangements were made for the railway company to leave a car to be loaded by us. Where there is a small lot of fruit to be shipped from a station, we have to do the best we can—throw it in a pile, and let it go. On two occasions this year we were very successful in shipping our apples. One steamer came that had a cradle, and it let the apples down very easily. Later on in the season we got a vessel which had not such accommodation, and the apples were very much injured. The only remedy I see that we have for this thing is for the growers, wherever the quantity of fruit shipped is sufficiently large, to combine, and by so doing they can always get such facilities. That is one object which we are aiming at, at present. As far as packages are

concerned, my experience in shipping is that there is nothing better for our soft perishable fruits, such as peaches, plums, etc., than the handled baskets we are now using. I think it would be an advantage, if there was something contrived like a straw mat, to be placed in the bottom of apple barrels, which would cost about a cent or two each, and our apples were then well shaken into the barrel—not pressed; I think we are over-pressing our apples in the barrels; I think a little change in that respect would effect something desirable. I have heard some of our growers speaking of getting up such a mat as I refer to, and then shaking the apples lightly into the barrels.

THE PRESIDENT.—Do you find any difficulty in packing and shipping raspberries?

MR. PETTIT.—There are very few raspberries in our section of the country; and as far as strawberries are concerned, I believe we succeed very well in shipping them as far as Toronto. There were some shipped as far as Montreal; but there was a great deal of loss, on account of heat and the length of time on the way. I think perhaps it would be an error to have our basket for handling peaches too large. The more fruit there is together, the more the danger of its being mashed, because its own weight will mash it if not very carefully handled.

THE PRESIDENT.—Do you think there would be any advantage in sizing it?

MR. PETTIT.—What is not fit to keep at home is not fit to ship. We always calculate to get our fruit a little on the hard side. It must be so if it is going a long distance; and if a soft peach and a hard one are put in the same basket, the soft peach must suffer.

THE PRESIDENT.—In shipping such apples as the Northern Spy, you sometimes find two or three different sizes on the trees; do you find it any advantage to ship the smaller ones by themselves and the larger ones by themselves in different baskets?

MR. PETTIT.—I have not yet fruited the Northern Spy; and among the other varieties which I have—the Greening, the Baldwins, the Spitz and the Russets—I do not find any great difference in size. If they do vary any, I have never yet sorted them; I always calculate on sending those that are good and fair.

MR. BEADLE.—What we got from our worthy director from Grimsby is quite in keeping with some thoughts that have been travelling through my head, and to which I gave some expression in one of my articles in the *Canadian Horticulturist*, and that is this, that our fruit-growers are losing the benefit of their labours largely from not adopting a better plan of getting their fruit to market. Among our farmers about St. Catharines one man will have perhaps 50 barrels to place, another 20 perhaps, another not more than 15, and perhaps another will have 100. They fold their arms and wait for somebody to come around to buy their apples. It seems to me that is a very unwise thing to do. Perhaps somebody will not come around at all, and if he does he will want to get their fruit as low as he possibly can. I think our friends at Grimsby have set an example to the farming community—that portion of it by whom apples are grown—which is well worthy of being promulgated through the country at large; they have combined. There is no one man about Grimsby, as I understand it, who has an orchard of some thousand trees, as some gentlemen have in western New York. There, there are comparatively but few trees, and these in a great many hands. Now, it seems to me that if our friends in that locality would put their heads together and form a farmers' club, or a fruit-growers' club, and get one man to attend to the business of marketing their fruits, and, if necessary, send him to some of the city markets to find out where their fruits could be best disposed of, and what way they should be put up, they would find that it would pay them to give that man either good wages or a percentage on the fruit sold, and that they themselves were at the same time reaping an advantage from pursuing such a plan. I got a letter from Dr. Hoskins, of Vermont, lately, in which he said, "The people are discouraged in raising apples here; thousands and thousands of bushels of apples are rotting on the ground," and it seems to me that Mr. Bucke wrote me a similar letter, saying that there were thousands of bushels of apples rotting in Lambton, Essex and Kent. Such complaints remind me of what I was reading about a jury in California bringing in as their verdict "Served him right." It does serve these people right. Our farmers have somehow lived so isolated, that they have never got it into their heads that combination can effect something; but our Grimsby friends, at any rate, have found it out. At all events, they are trying the experiment, and so far as I can understand they are satisfied with it.

MR. PETTIT.—We have organized a Joint Stock Company, and had it incorporated, for the purpose of selling our fruits—handling them ourselves. We have 50 odd stockholders in the company, and each stockholder is limited to one share. The company is not organized for stock speculating purposes; its object is to have one man from among us sent to sell our fruits. The fruit is shipped to Montreal. The business is managed through a board of directors. The agent deposits the money which the fruit realizes in the bank to the credit of the Company, and a cheque is issued to each shareholder for the amount of his share of them. During the past year we have handled a considerable quantity of fruit for a first transaction, and I believe the plan has given general satisfaction. Our stock is not all taken yet. Our capital is \$10,000, in 100 shares, and now at the end of the year I believe it is the intention of the Company to open the stock books for the whole amount, as we find we can now manage a much larger business than we started with. Our warehouse in Montreal—our agency—is open now to any fruit-grower who wishes to consign his fruit there, and he can depend on its being handled on the best possible terms.

A MEMBER.—Does that include all kinds of fruit?

MR. PETTIT.—All kinds of Canadian fruit.

MR. WOODWARD.—We pack fruit similar to the manner in which your people do. Our best method is to set the apples in our barrels stem end down, three deep—though some only set them two deep, and those who are careless only one—and having set them down carefully all around, we fill up the space inside as full as we can. For number one apples our best packers select only perfect fruit—it is not as good as at the ends, but the apples are all perfect, and nearly uniform in size. We use a basket made of staves, with a loose handle to turn down. We pick that full and then turn the apples into the barrel, which we shake pretty thoroughly. We also press the apples, but not enough to bruise them much. After that we have no difficulty about their getting to market without bruising. The trouble with our people is that they are Yankees, and the majority of them are not more honest than they ought to be, and they are disposed to get in all the fruit they can—they cheat the hogs. Last year we put up 500 barrels of Russets. They lay there till about the middle of March, and I then sold them to a man to go to Chicago. I told him he might take his own hands and pick them over. He did so, and then came and paid me for 497 barrels—a shrinkage of only three barrels in 500. If you put your apples up in that way you will have no difficulty in selling them, and the same man you sell them to will come back again for more. We find it a great advantage to put the name of our orchard on the barrel, and also the number of the apples. Our legislators are very much afraid of monopolies, unless they are railroad monopolies. A few years ago we thought we would establish an association at Lockport, so that we could market our own fruit. We asked our legislators to grant us a special charter, and in that charter we wanted the privilege of punishing our own members; but that the Legislature refused to do. We proposed that supposing there were twenty of us in the Association we would each have a card, and on 19 of the cards we would print 19 names, leaving a blank for one of the names; and we propose to have a stamp on the head of the barrel, by which we would guarantee that every barrel bearing that trade-mark contains as good fruit clear through as what was in the ends of it—if not, we would be responsible. The object of leaving a name blank in each card was this:—Supposing we three men were in the Association. When we joined we agreed to pay \$10 forfeit for each barrel that was not put up in accordance with the conditions determined upon. This money we asked the Legislature for the privilege of collecting without litigation. I would receive from the President a lot of cards on which my name was omitted from the list of names printed on it. I would write my name in the blank, and when I got through packing, I would throw one of those cards in each barrel, and it would be then sent forward to market. Then we would expect that when a customer bought a barrel of those apples, and found it was good all through as at the end, he would be very likely to look again for the trade-mark which was on the end of it. But if he happened to buy a barrel which was not good all through, we proposed to have him take the card he found in it, write to the man he bought it from, and that man would pay the damages and send it right back to us, and we would call on the gentleman whose name appeared there and make him pay the forfeit. I know that such an

organization as that would pay. I have found that if I could get into the same market two or three times, I could secure it for my fruit; but if we work in an isolated manner the dealers get the advantage of all we do.

The PRESIDENT.—How do you pack your pears?

MR. WOODWARD.—We usually pack our pears in half-barrels. If we can stem them we do so; if not, we lay them down and then press them, but not so hard as the apples; being in half-barrels, they do not require to be pressed so hard. The Bartletts are usually kept in ice-houses, and then sent forward in ice-cars.

The PRESIDENT.—Mr. Woodward reminds me of a company formed in Belleville; it is an organization for the purpose of packing and shipping the fruits of the members to the best markets. Each man has a card; all use the one trade-mark; and every man must have on his own fruit his own card. A request goes with every package that a description of the condition in which the fruit arrives shall be sent back. The way they manage the picking is this: After arranging a table with a cloth on it and a rim around it, they have the pickers empty the fruit out on it. The apples are then all carefully sized—they won't have two sizes in the same barrel, let it be apples, pears, or anything else. Of some varieties of apples they make three different sizes, and when they are shipped to Europe the smaller sizes often bring the most money; but when the sizes are mixed, it has been found—even when there are only two or three apples in a barrel which are different in size from the ordinary run of them—that there has been about three shillings difference in the value. In England, mixed sizes of apples will not fetch within three shillings of what the smallest apples—those that we would be inclined to cull out—will when all of the same size. By the use of the cards, the Association can easily weed out a chap that they find is guilty of any little trick. I was only a few days ago looking over the Annual Report, and I find that that little company has realized this year from two to three shillings a barrel for their apples more than the quotations in Liverpool. My last shipment was Golden Russets and Northern Spies; the packages were lined with printers' paper, and the apples arrived all right, and sold readily at 22 shillings sterling, half Golden Russets and half Spies.

MR. WOODWARD.—Instead of using tables, we have a suitable number whose business it is to attend to picking the apples, stemming them, and filling the barrels, and others whose business it is to head them. Each person picking up sorts the apples into different baskets as he picks them; and we endeavour to put the same sized apples in each barrel. We would as soon have a barrel of Baldwins of medium size or under, if they are sized, as one of larger ones. The person barrelling gets so accustomed to his work that as soon as he looks at the baskets he can pick out the size he wants. We like that plan better than using tables.

MR. BEADLE.—I would ask if any gentlemen who have been packing apples have had any experience in wrapping each apple in soft paper? I have conversed with some who hold that there is a decided advantage in it in two ways—one is, that it evinces a care, which goes a good way with the purchaser; another is, that the apples are less liable to bruise. Having packed them with a little soft paper wrapped round each one, you can press them down, and they are less liable to move about than when the apples are left unprotected by paper.

MR. WOODWARD.—The only person I have ever known to undertake that in Western New York is Mr. Vick. He, for instance, buys two or three barrels of the best Northern Spies he can get, and sends them packed in paper in that way, and it is no uncommon thing for him to get \$15 or \$20 a barrel for them.

MR. ORR.—As to apples being injured by carrying them on waggons, I would like to ask Mr. Arnold if he could suggest any remedy?

MR. ARNOLD.—The only remedy I can suggest is having spring waggons for them—strong springs would carry very heavy loads. I have sent apples a long distance on two occasions wrapped in paper. I sent one barrel to Nova Scotia, and the person to whom they were sent was very much pleased with them. A friend of mine sent a barrel to Scotland, every apple in which was wrapped in a separate piece of paper, and every apple reached there in fine condition; and in consequence of his success with that shipment he

expects to sell hundreds of barrels next year. He contends that if it pays to wrap oranges in paper it will pay to wrap apples in it.

MR. CROIL.—I have sent several barrels to Scotland wrapped in paper, one barrel at a time, and I have found that those apples rotted as well as what were not wrapped in paper; others I packed in sawdust, and they did not keep as well. I think we err very much in over-pressing apples; if they are thoroughly shaken it is sufficient. From the little experience I have had, I do not think packing in paper would save the apples.

MR. A. M. SMITH.—I think there is more in shaking than there is in pressing, a good deal. I think a great many people err in packing apples, placing say one tier in the bottom of the barrel, then filling up the barrel, and not shaking the apples sufficiently. I have had a talk with Dr. Watt, who has just returned from the old country, and he says he saw there apples that he had put up himself for some of his friends, and they were slack when they were opened; I think he said they were apparently sound if they had not been bruised by the shaking. I have bought apples before now of parties who had put them up, and apparently they were all right when I examined them, but after teaming them a few miles to the station they were loose in the barrel, although they had appeared to be tight in the orchard. This idea of sizing apples is, I think, a very good one, but one that is not generally understood among our farmers—they are apt to put all sizes in the same barrel, providing they are sound.

MR. BEADLE.—A little experience of one of my neighbours corroborates what Mr. Smith has just said. He sent some twenty barrels of Ribston Pippins to a gentleman in Nova Scotia; they were nice specimens of apples, well packed. He thought he had put them up all right, but when they arrived in Nova Scotia they were found to be loose in the barrel, and very much bruised. I did not see the apples put up, and could not tell what the matter was, but it just occurs to me that Mr. Smith has hit upon the real trouble—they were not properly shaken as each basket was put in. Had each basketful been well shaken, so that each apple would have found its own place, there would have been no other trouble. The gentleman, in writing about the apples, suggested that there was perhaps a shrinkage in the fruit itself, owing to evaporation; they were shipped in the latter part of September, if I remember right, and the gentleman in question said he thought it possible that they were shipped too early, and that evaporation was caused by the warm weather. I feel confident now that the shrinkage was from insufficient shaking rather than from evaporation. If such a thing as that takes place, it is possible that it may be remedied to some extent by wrapping the apples in paper, and filling up the interstices with paper. I have seen—I think in the *Scientific American*—that if paper which has been dipped in a solution of salicylic acid—an acid prepared from the willow, which is said to have great antiseptic qualities—and then dried, be wrapped round specimens of fruit, any decay which has started in an apple will be confined to that particular apple, and very probably arrest its further progress—for a length of time, at any rate. I want to ask if anybody has had any experience of the use of that paper or acid in arresting or preventing decay? I am told that if this acid is mixed in certain proportions with cider it will prevent its fermentation even in a warm climate.

MR. WOODWARD.—I am inclined to think that one reason of your apples shrinking is that you pack them immediately after picking them from the tree. We used to have the same trouble that you talk about now; but latterly when we pick them we either remove them to a barn or put them under straw, and leave them there for from three to four weeks—and they certainly do evaporate and shrink during that time, and they also become more yielding than when they were taken from the tree. I have not heard of any difficulty in regard to loosening in the barrels since this plan has been adopted in western New York.

MR. BUCKE.—On this subject I may read the following, which I find in the *Horticultural Magazine*:—

“In Covent Garden I hear a very good account of Canadian apples, and was surprised to learn that they were beating the American produce out of the field. There seems some reason for this, as the Canadian apples are better packed: the American barrels are usually ‘topped up,’ in market parlance—a layer or two of good fruit at the top, and then fruit of a poor quality below. On the other hand, the Canadian fruit is generally fairly

good throughout, the barrels are well packed, and considerably larger than those of the Americans. A very excellent apple, which has been coming in in large quantities, is what is called the Golden Russet; it has a high and rich flavour. In some sales lately Canadians, when compared with Americans, were in the proportion of over six to one. This must be very encouraging to the Canadians, and should teach the Americans to pack honestly if they wish to keep the trade."

MR. TENEYCK.—I think that in packing apples it would be well to have a piece of planking to shake the barrels on. The ground sometimes becomes soft, and then you cannot shake the apples as well on it as on plank.

MR. BUCKE.—It is the custom in England that everything from this side of the Atlantic is sold as American—it does not matter whether it comes from Canada or South America. But they are beginning to discriminate now between Canada and America.

MR. PETTIT.—In labelling the packages—of peaches particularly, but generally also of grapes and other small fruits—the grower is not as particular in putting on the names of the varieties as he is in the case of apples. I think it would be profitable in the end if he would place the name of the variety on all packages of fruit, whatever the description. The consumers would then become acquainted with the different varieties, and know which of them best suited their various tastes, or their ways of using fruit. All the yellow flesh peaches are palmed off for Crawfords. There are some kinds of peaches,—such as the Morris' Whites or the Barnards—which, for canning, are superior to the Crawfords; but the consumers all want the Crawfords. I shipped several tons of grapes to Ottawa, and I labelled them all very particularly. I put them up in fifty pound baskets, laid the clusters in lengthwise, and they gave good satisfaction. I also shipped between one and two thousand baskets of peaches, labelling the baskets particularly, and they too gave good satisfaction. I think if growers would adopt this plan with all their fruits, and thus let the consumers become acquainted with them in their varieties, the result would be of great benefit to both.

MR. BIGGAR.—I believe that almost all the black grapes that came to Toronto last season went under the name of Concords. They did not know any other name.

The PRESIDENT.—I noticed last year, in the quotations of the English markets, a variety of apple labelled "Phoenix," that commanded good prices. This year I have seen four varieties going to Europe as the Phoenix. The consequence is, that the English people will not want any Phoenix apples next season. This is practised only by the fruit buyers who go round the country.

MR. ARNOLD.—What is the size of Canadian barrels for shipping apples? We hear that the Canadian barrel is larger than the American. We asked our Legislature once to fix a size for barrels, and I forget whether they did or not. I think, if possible, we should have barrels of uniform size.

The PRESIDENT.—I recollect that we asked our Legislature at one time to regulate the size of the apple barrel, so that it would be something like the American barrel—one hundred quarts. They did so; but ours happened to be sized according to Imperial measure, whereas the American barrel is sized according to the Winchester measure, and consequently our barrel is a little the larger of the two.

MR. A. M. SMITH.—I would like to know what is the size of a basket of peaches, and I might also say of a quart of strawberries. I think there is more variation in them than in the size of our barrels a good deal. Some shippers send their peaches in twelve quart, some in fourteen quart, and, perhaps, some in sixteen quart packages. Now, if one man orders a basket of peaches from me, and I send him sixteen quarts, and his neighbour orders a basket from my friend Mr. Pettit, and he sends him twelve quarts, and if these two men happen to live pretty close together and they happen to notice the difference, there may be a little dispute as to the ownership of the larger basket. I think it would be a good idea to have a regular standard for a basket of peaches or plums.

MR. BEADLE.—I have often thought of this matter, and wondered how we could remedy it. Perhaps by some united action we may succeed. It is time there was some definite agreement as to the number of quarts that make a barrel, the number of quarts that make a basket, etc. It used to be supposed that a basket of peaches was about half a bushel; but it has got to be "about" a little smaller, and "about" a little less, until it

is "about" anywhere now—we know nothing about the size of it. It seems to me that it would be a wise thing for us to appoint a Committee to consider this matter, and when they have agreed upon something, to get our Legislature to deal with it. I move, That the President be authorized to appoint a Committee of three to sit upon this question of measures; and that they take time with it, and report at the summer meeting.

MR. PETTIT.—Isn't the American barrel smaller than the Canadian?

MR. WOODWARD.—Our apple barrel holds one hundred Winchester quarts.

MR. PETTIT.—Ours, I think, holds a little more. Does the Canadian barrel, on the strength of the quantity in it, bring one cent more than the American barrel—the fruit being of the same standard of quality? I do not think it does. I think if a man wants a customer, and is shipping to him, he is going to give him as good value as he can—and he is not going to send him smaller barrels or smaller measures than it is to his interest to do. If you put peaches in a large basket, you cannot carry them to market well. If you put them in large baskets, you do not have so many baskets to buy; whereas, if you think you can get your fruit to market in better shape in smaller packages, you have to pay a little more for your baskets in doing so. I do not think a Committee could accomplish anything by sitting on this question. If a man will not put up his apples properly he is the sufferer, as he will learn sooner or later. In reference to packing apples, I think there is a great deal of neglect in that matter. I have been trying to practise on different fruits for the last two or three years. I keep a horse and buggy in the orchard while picking, and have the fruit taken in out of the sun and put in bins. I leave it there for two or three weeks, and then put it up in the shade. This last year I packed a barrel outside, and left it lying about an hour in the sun—I then brought it in and opened it, and it was like an oven inside of the barrel. I think that if we had cool places to pack our apples in, and then, as soon as they are packed, put them in a cool, shady place, and leave them there till the weather is cool enough to ship them from the country, we would find a great deal less slackness and a great many fewer rotten apples in the barrels.

MR. A. M. SMITH.—I do not know how it is in the English market, but I put up apples for a firm in New York for two years, and they were willing to pay me twenty-five cents a barrel more for apples which were packed in our barrels here than for those packed in American barrels across the line. And I understand it was the practice of this New York firm to transfer the apples from the Canadian barrels into their own barrels, and in that way they made quite a profit on the apples. In regard to baskets, I think that a twelve quart basket would perhaps be preferable to a sixteen quart; but if I were going to suggest a size, I would split the difference between the two, and choose a fourteen quart. I think it would be better for both consumer and shipper to have a uniform size, not only in barrels, but also in peach baskets and in berry baskets. In our market, St. Catharines, sellers are obliged not to break bulk. If they bring in berries in baskets, they must sell them in the baskets. But there is nothing to prohibit them selling them in any size of basket. The same remark applies to peaches; if they are sold by the basket, basket and all, it makes no difference what the size is. They may be sold by the basket—but if they are sold as baskets containing so much, and the measure does not hold out, they are liable to be confiscated.

MR. ARNOLD.—Several of our friends have been talking about Canadian barrels. I have asked the question whether there is such a thing as a Canadian barrel? We have various sizes of barrels.

THE PRESIDENT.—If Mr. Arnold would only look at the quotations of the sales of fruit in Liverpool, he would see that the American apples regularly brought from two to three shillings less than the Canadian apples per barrel. I presume the difference in the size of the barrel has something to do with that. Our barrel is one-fifth larger than the American, if we use the flour barrel.

MR. BEALL.—Can anyone present give the size in cubic inches of the American barrel?

MR. WOODWARD.—The size of our barrel is 16½ inches head, 28½ inches in the stave, and 64 inches around the bilge. The dealers universally want a big barrel; the growers say the hundred quart barrel is the most satisfactory barrel they have ever used. If there was a difference of two or three shillings a barrel in England, and it was on account of the size of the barrel, still we would receive the most money for our fruit per hundred

barrels. If it is a fact that barrels chafe in crossing the water so that they often wear holes in each other, then the hundred quart barrel is large enough. This is a matter with which I think the Legislature has very little to do. They can establish a size for a package of fruit; but when they attempt to pass a law to fine me or any other man for putting fruit into a different sized package, I think they propose to do more than they have a right to do. If I choose to put my fruit in a nail keg I have a perfect right to do so, and if the buyer does not want it in a nail keg he is a fool to buy it in it. If a man should attempt to ship peaches to St. Louis in 16 quart baskets he would ruin himself, because he could not get any more for them than if they were in 11 quart baskets. The different local markets want different quantities in the baskets.

MR. WHITE.—In listening to this discussion I have become thoroughly convinced that it is high time something was done. There seems to be no standard for Canadian barrels. For all agricultural commodities there is a standard; and if there is not a law regulating this matter, I think it is quite time that we should ask the Legislature to make one. If I buy a hundred barrels of apples I want to know what I am getting; and the same if I contract for a hundred baskets of peaches. As our Legislature is sitting now, I do not see any reason why we should not ask them to consider the matter. As I understand it now, the buyer does not know what he is going to get until the barrels of apples or baskets of peaches arrive. How can I contract with a man if I do not know what I am going to get!

MR. WOODWARD.—With us the buyers make bargains as to the size the baskets are to be according to the market they are going to ship to.

Moved by the Secretary, Mr. D. W. BEADLE, and seconded by Mr. A. M. SMITH:

Resolved,—“That the President appoint a Committee to enquire into the best size of apple barrels and other fruit packages, and the steps requisite to secure uniformity of size in such barrels and packages, to report thereon at the next meeting of the Association.”

MR. ARNOLD.—I would freely endorse that motion if all was struck out after “apple barrels.” There is something in the experience of these gentlemen in packing soft fruits, which they certainly know more about than we do; and I know myself that when in certain conditions, soft fruits require small baskets. The only remedy I can see for that, if this motion is acted on, is that there should be baskets and half baskets. That could be done in the way of quart baskets, and in some cases we would have to send pints instead of quarts. I think if the gentlemen from Grimsby could agree among themselves, they would be better judges of what the size of baskets should be than anybody else.

MR. BEALL.—I have been anxiously waiting to hear some person state that the law as it stands has already defined something with respect to strawberry baskets. There is an impression in my mind that if it is not defined by statute law, a decision has lately been given in one of our courts making it imperative that the packages in which strawberries are sold shall be quarts. I would like if Mr. Woodward or somebody else can give me the cubic inches of the Winchester quart.

The PRESIDENT.—With respect to quart baskets, I think that any man who is shipping raspberries should be obliged to send them in quart baskets; but I think it would be very hard that when they arrived in the market he should be held for a quart in the basket. I presume that strawberries and raspberries would be better shipped in three half pint baskets. Nevertheless, that would not interfere with the regulation of the size. If peaches are better shipped in 12 quart baskets, I do not see why there should be anything to hinder that size from being fixed upon.

MR. WOODWARD.—The Winchester quart is 67½ cubic inches.

The motion was then carried.

BEST METHOD OF PRESERVING FRUITS AND VEGETABLES BY DRYING.

MR. BEADLE.—Mr. President, I will try to introduce this subject, though I hope there are some here who can give you more information in regard to it than I can possibly do. I remember very well seeing, when I was a boy, pieces of apple, quarters or eighths perhaps, hanging on strings round the chimney corners in the old log houses of the country, or strung up on poles, sometimes outside the door and sometimes inside. After hanging there for a time like so many beads, they were spread out on boards and laid up

in the sun. That was the method of drying that was in vogue in those days for apples and peaches—not often pears; there were not so many of them. I understand that that mode of drying has not altogether disappeared yet. I notice quotations in the market for dried apples and evaporated apples, and I suppose that the “dried apples” are those that I have just spoken of—dried on strings, where the flies, the sun, the smoke and the dust can get at them. I believe that is not the best way of drying fruit, if I can judge from the quotations, which, if I remember right, make at least double in favour of the evaporated fruit over that which is quoted as dried fruit. I have visited, at the request of the Board of Directors of this Association, several fruit-drying establishments, and we made a very elaborate report (which was published in our Annual Report), showing how fruit is evaporated. The apples are pared and sliced at one operation. They are put on a spindle, and when they come off it they are pared and cored and sliced, and all you have to do is to separate the slices, and the apples are ready for drying. Then the apples are placed on wire trays. Some think the wire discolours the apples.

MR. A. M. SMITH.—They are using galvanized wire now.

MR. BEADLE.—These are then placed on the framework near the fire, which rapidly evaporates the apples—takes out the superabundant juice, so that when the trays get to the opposite end of the inclined plane in which they are placed, the apples are sufficiently dry to be taken out and packed. They have lately adopted the idea of taking out all the colouring matter of the fruit by means, I suppose, of sulphuric acid—I suppose it is sulphuric acid. They put sulphur in and burn it, and the fumes of the sulphur take out the colour. By this process the fruit is made to look very nice. I notice that in New York it is quoted at pretty good figures, and I should think it must pay well, because I know that this year these fruit-growing establishments got their apples at about 15 or 20 cents—I should say an average of 16 cents at the furthest—a bushel, very fair apples—not such apples as we would send to Liverpool; and if I remember right, from 25 to 28 cents was the price per pound in New York.

MR. WOODWARD.—They are very low this year. There was one time this year that they were 11½ cents.

MR. BEADLE.—Whatever the quotations were, I remember saying to myself, “That ought to pay;” and I believe these drying establishments generally do pay. There has been one started this year in St. Catharines, and I believe that establishment has a branch at Beamsville. I believe there is none at Grimsby yet, but there is one at Fonthill now. This thing will spread; and I am very glad of it, because it will afford a market for a class of apples which ought not to be sent to market, but which enables a man who is anxious to sell all his apples to do so without cramming them into a barrel. There are several dryers manufactured. There is the Williams, the Alden, the Pacific, the California, and others; but the principle is the same in all—they extract the moisture and leave the apples in such a condition that they are ready to be packed up as soon as they come away from the dryer. By this process you can put a barrel of apples in a very small space, and when it comes to the consumer all he has to do, in order to make use of the fruit, is to put it into water, allow it to soak, say overnight, and by that time it is all swelled out, and can be made into pies or puddings; and I am told that it requires a very sharp taste on the part of the eater, when he is eating the pie or pudding, to tell whether it is made from apples just as they came from the tree or not. It is cleanly; it is sweet; it will keep for a length of time; it is good for shipping; you can send it any distance you want—round the world if you like—and when it is cooked it is almost if not quite as good as fresh apples. Not only does this way of preserving apples open up a way of using up a class of fruit that we do not want to send in the barrel to market as fresh fruit, but it also enables the grower to get a fair price for what he would otherwise less profitably feed to his pigs. I believe that we are going to have these establishments scattered throughout Canada so generally that they will be within the reach of almost all our fruit producers, and enable them to market their fruit better in the future than they have been able to do in the past. At all events, there will no longer be the same temptation that there used to be to get apples of a certain quality into the market surreptitiously.

MR. MORRIS.—I am interested in the dryer at Fonthill, but I do not know that I can add anything to what Mr. Beadle has already said. The one we purchased is a Williams.

We went to New York and examined the different makes, and after considerable enquiry we chose it. So far it has given every satisfaction, and I do not know how it could be improved. I am told that the fruit evaporated by the Williams is quoted at a higher price than any manufactured by any other evaporator. One way in which I account for this is: On the sieves of the Williams the fruit has to be spread in a single layer—you cannot put two pieces one on top of the other—and the consequence is that it dries evenly. In some of the other dryers, on the other hand, you can pile the fruit up an inch or two thick, and in that way it does not dry as evenly. I believe if these dryers come into general use, it will make a great difference in the quality of fruit that is shipped.

MR. BEADLE.—Can you describe the bleaching process?

MR. MORRIS.—With the Williams the fruit is bleached after it is put in the dryer. There is a little can in which the sulphur is burned, and then the sulphur runs into the evaporator through a little tube, and then it goes up through the fruit. In all the other evaporators that I have seen, I believe the fruit has to be bleached before it is put in the dryer; and when it is bleached in that way it keeps the premises in a dreadful smell. With the Williams you do not smell anything bad.

MR. ARNOLD.—Do you know whether the sulphur has any effect on the flavour of the fruit?

MR. MORRIS.—We cannot notice any difference, and we cannot tell any difference between the green fruit and the dry when it is cooked. We have tried drying pumpkins, and we have succeeded so well that we intend going into that next year.

MR. A. M. SMITH.—At present they are drying potatoes in St. Catharines. There the bleaching process is independent of the drying. The fruit is put into a box where sulphur is burned before it is put in the dryer. Before the fruit is dried you can taste the sulphur in the fruit; but the evaporation takes the flavour all out.

MR. WOODWARD.—I think that Mr. Beadle is wrong when he says that all the dryers dry by the same process. I think that they use two distinct processes; in one the green fruit is taken immediately over the fire—into the intense heat—first, and it is then gradually passed up through the moist air; or it is first put into the moist heat and then carried into the heat that is dryer. In the other they finish off over the greatest heat. I believe our people in western New York now regard the Williams, the Alden and the Seymour as essentially the same thing—as being the best dryers. We find it makes little difference in drying apples whether we bleach the fruit first, or burn the sulphur and carry the sulphurous acid gas up through the fruit; but in drying peaches we find that it makes a very material difference. The better variety of peaches colour very quickly after they are prepared for the dryer; and we now have a bleaching process—I think it is patented—by which we have the fruit passed right through the sulphur as soon as it is prepared, and it is then put directly on the dryer and immediately carried over the fire. I have never heard that this causes a bad smell in the room; there is a draught of air through the tube which keeps the fumes out of the room. There is no doubt that the same kind of fruit, after it is dried, becomes sweeter. I was at Rochester last spring with some gentlemen, and we took dinner at the Whitcomb House there, and I think we all took apple pie. I accidentally happened to get a piece of the apple that had not been thoroughly soaked, and by investigating closely I discovered that it was dried apples we were eating. I waited until after we had got out, and then I asked those gentlemen how they liked that pie. They said they liked it pretty well. I asked them what variety of apple they thought it was. They said they thought it was a Greening, but they thought it was a little sweet. I told them it was dried apple pie they had been eating; but they would not believe me till we had had the landlord go in and investigate and find out that it was dried apple pie. Last year these apples were selling at from 14 to 16 cents a pound in New York, and every man who had an apple dryer had a bonanza. This year they have been selling as low as 8½ cents a pound. They are now paying as high as 40 cents a bushel for apples to dry. It costs about two cents a pound to dry the fruit. About five pounds of the dried apples on an average are obtained from a bushel of the undried, and that pays very well. I have no doubt that of large dryers and small dryers there have been in operation this year in Niagara county more than 200. There are probably not less than 35 dryers that have been running 300 or 400 barrels a day each. An error which our people have been

making is that they have begun to dry too early, and to dry unripened fruit. They do not seem to realize that the putting of that fruit into the market will create a prejudice against the evaporated article. It is bad policy on the part of the fruit-growers to attempt to force that kind of fruit into the market. Let the fruit get ripe, and then use only good fruit. We find there is a great deal of difference in the amount of the dried article which different varieties of apple will yield. Our experience is that no variety will give such a yield as russets—the quality is not so good. Our people are now keeping the different varieties of apples distinct, and when they pack the dried fruit they mark the variety on the boxes. I think that is a good plan, because the process of treating a Russet that is made use of in drying a Greening will not make the pie or sauce from both the same. Another great mistake that our people over there make is, that they do not leave enough of the apples to feed the hogs. One man told me that if he had known the great profit there was in drying peaches he would have put up eight or ten dryers and run them all through the season. He says he is satisfied that he could pay at least 30 cents, and he thinks, if they were good peaches, 50 or 60 cents for three-peck crates just for the purpose of drying.

MR. BEADLE.—Those who have read the *Horticulturist* will have observed a little article of mine as to how our neighbours dispose of their surplus apples. I should say that in the neighbourhood of Rochester the pigs do not get much apple sauce for their dinner. Everything in the shape of an apple was brought into a cider-mill there in sleighs, and then, in addition to that, other apples were being brought there in ear-loads, and as they were being unloaded I heard the foreman telling the men to mix the frozen apples and all the others up together. There was an immense quantity of apples there in a great long building with cider-mill after cider-mill in it—I was told how long it was, and how much longer they were going to make it—and there they grind these apples up by steam, and press them by steam so as to squeeze the juice all out of them. Then they send all the way to Jersey and Massachusetts to get sand, and they put the cider on a bed of this and let it percolate through it, and then put it up in barrels and send it off. In this way, it seems to me, there is no chance for the pigs at all; every apple that has a particle of juice in it is squeezed up and used up. Why, it is used twice. After they squeeze all the juice out they soak the pummace in water, and then squeeze that out and—they say—make vinegar of it. I do not know about that; I thought perhaps some of it went into the cider.

A MEMBER.—Would it be profitable to dry plums sold at 60 cents to \$1.00 a bushel?

MR. WOODWARD.—With us they pay from \$1.50 to \$3.00 a bushel for plums for canning, and they told me they were unable to get as much as they wanted of the whiter varieties. I could not say as to drying. I do not think they ever tried drying plums with us at all. Plum-growing is in its infancy there.

MR. BUCKE.—I have a good many friends and relatives living in India, and they use a good deal of fruit out there, but they cannot grow the northern fruit there, and they get it from California put up in cans. In a climate like that, these dried fruits would bring a very good price; the canned fruits bring an enormous price. Any one can see that when fruit is going a long distance it can be more handily carried in a dry condition than in tins or cans. It would be a great thing for this country if we could control the dried fruit trade with India. We are now subsidizing a line of steamers to Brazil, and if we could send our dried fruit down there and to the West Indies I do not think the capacity of Canada for fruit-growing would be sufficient to supply those warm countries with it. Probably one of the best investments that a person could go into would be to put his money into the drying of fruit for the markets of hot climates—especially where there are Europeans who have been accustomed to the fruits of more northern climates.

MR. BEADLE.—I received a letter from an acquaintance in California a few days ago, in which he said that a neighbour of his had been drying apricots and canning them, or canning them and drying them—I forget which. He had received an order from England for 30 tons of canned apricots.

MR. BEALL.—There is a large vegetable drying machine at St. Marys, and I believe

the proprietors of it are going largely into the drying of potatoes, tomatoes and corn. I do not know anything about how it is done.

MR. A. M. SMITH.—The process of drying vegetables is very much the same as drying fruit. Mr. Beadle went in company with me to Rochester for the purpose of inspecting these drying machines, and we found that they had a large contract there for the drying of onions. Last winter a large drying establishment on the other side also dried a large quantity of cabbages, and at present they are drying potatoes in those establishments in which they are drying apples. Black raspberries are good fruit for drying. They lose about as little as any fruit, and they command a good price. I know parties offering to make a contract to pay six cents a quart for black raspberries—any quantity for years—for the purpose of drying them. I do not know whether they dry corn in these or not; I think it might be done. There is a community at Oneida, on the other side, who send out a great deal of dried corn. I think it is prepared by a similar process.

MR. WOODWARD.—We used to have several establishments in our county for drying corn. They claimed that they were very successful, but I notice that all those who were connected with the business have quit it. I think it is extremely difficult to dry corn so that it will retain its flavour. Canned corn is, I think, so much better that the dried corn cannot compete with it. In the edge of Orleans County, near our county, we have an establishment conducted by a doctor who has been experimenting, and who is making what he calls dry soup. He takes the different vegetables and puts them together in the proportions necessary to make a fine soup.

MR. BUCKE.—They dry carrots, I believe, at St. Marys, and say it is very profitable. The PRESIDENT.—There is a drying establishment at Belleville.

A MEMBER.—There is a very large one at Tilsonburg, drying apples.

SORGHUM.

MR. WHITE.—My next neighbour tried a small quantity of sorghum last year, and took it where a man had rollers, and had it manufactured into syrup. I had a quart of it on my table; it had a little peculiarity of taste, but it was very good syrup. In the Western States they are manufacturing it in large quantities, and it seems to be very profitable.

The PRESIDENT.—I know a gentleman who has tried a small quantity of it this year. He had just temporary rollers for expressing the juice, he had only three rods occupied with the sorghum, and he had about 16 gallons of very fine syrup. I grew a small quantity of it for cow feed, and found it was very profitable for that.

MR. ARNOLD.—I would ask Mr. White if any sugar has been made from the sorghum in that part of the country?

MR. WHITE.—They are making sugar in large quantities over in the Western States; I see that in the paper.

MR. BUCKE.—There is a difficulty in granulating the juice from the sorghum. There is also a very great difficulty in granulating the syrup from the sugar beet. There is no difficulty in getting the syrup, because you just squeeze out the juice and boil it down, the same as you do maple sap, but when you come to try to crystallize it you require very expensive apparatus. Some person in the States got up a mixture to granulate the syrup; I have not heard whether that is doing very well. The real way to do it is to granulate it in the vacuum pan. And only a large company is able to do that. It costs about \$50,000 to get such a pan. Sugar could be made from sorghum by a company with a capital of \$100,000; at any rate the mechanical process to be gone through is not so expensive as that for beet sugar. For sorghum you do not require charcoal, and then it does not need to be washed, as beets have to be. I have no doubt that before many years are over we shall be making lots of sugar in Canada.

MR. BEADLE.—I see in a number of our *Canadian Farmer*, published in Welland, an account written by a person who had gone up to Tilsonburg and made an examination into this manufacture up there. I rejoice that the Company has been formed under Dr. Joy, as stated in that article. Dr. Joy is a practical chemist. He went into the United

States and visited a large number of factories where they make the syrup and the sugar from the sorghum. There is no trouble in making the sugar if you know how, and this gentleman found out how. If my recollection is right, it takes 12 gallons of syrup to make 100 pounds of sugar. Dr. Joy found out what was the best machinery for crushing the cane, manufacturing the syrup, and the process of clarifying it and taking out the acids and other effete matter, whatever it may be, that is not wanted in the syrup, and they are now making both syrup and sugar, though I believe they have not made much sugar yet. They found so ready a market for the syrup that they have disposed of the largest part of their manufacture in that form instead of in the form of sugar. They have used up considerable seed there this year. They bought seed of the amber cane, planted 37 acres of it themselves, and they gave or sold seed to all the farmers they could get about them to experiment on the raising of this cane, and they used all the product of this up in the manufacture of syrup and sugar. The farmer finds that he can make a very good thing by growing the cane; if I remember right, he received three dollars a ton for it delivered at the factory. He can take off all the leaves and keep them for fodder, and he can take off the top and keep that for seed. He finds that the yield of seed is about thirty bushels to the acre, and that it is as valuable as shelled corn for feeding to his stock. The farmer is satisfied it is a good paying thing for him to grow the seed, and the Mill Company are satisfied it is a good paying thing for them to manufacture this cane into syrup and sugar. They say that about thirty per cent.—if I remember right—is the profit of this year's industry, notwithstanding all the disadvantages connected with it on account of its being a new enterprise; and so well pleased are they with their success that they are enlarging their operations. They are increasing their capital stock, and are going to have a large acreage of this cane planted next year. Another thing that the Doctor proposes to add to this industry, in connection with this establishment, is the manufacture of grape sugar. If you have read the *Canadian Horticulturist* lately, you will have seen something about a trial in which it came out in evidence how much money people were making by the manufacture of that kind of sugar. It was perfectly astonishing to me; the profits were immense. By growing the amber cane and manufacturing that into sugar, I believe we can certainly, after a time, produce enough sugar here to supply our people. I am satisfied, from all my reading about the matter, that sugar can be made more profitably in this country from the amber cane than from beets. Our Government some time ago offered a large bonus to any Company that would go into the manufacture of sugar from beets. I wish they would transfer it to a Company that would manufacture sugar out of cane.

MR. BUCKE.—The amount of sugar consumed in Canada is rather over than under thirty pounds per capita. At this rate, allowing seven cents a pound, there is about \$8,400,000 per annum sent out of the country for sugar alone. I find from some statistics quoted in the States that they get 180 gallons of dense syrup from an acre of sorghum, from which they make 1,800 pounds of sugar and 44 gallons of syrup, and this it is possible to increase to 2,400 pounds of sugar and 55 gallons of syrup. The Ontario Government one time offered a bonus of \$95,000 to encourage the manufacture of beet root sugar.

The meeting then adjourned for tea.

BEST SOIL FOR APPLE TREES.

MR. BEADLE.—There are some soils that apple trees will grow in very well, which are not so well adapted to the peach. My observation leads me to this conclusion, that if I were to find a soil of what I would call medium texture—not all sand—not the heaviest clay, yet having a certain amount of clay in it—largely abounding in lime, so that the water passing through it would get impregnated pretty strongly with it, and be what you would call pretty hard water,—I would prefer that soil for apple trees. Most of our apples are better flavoured, firmer in texture, carry better, I think keep better through the winter, when they are grown on a soil of that character. I think I have noticed a difference—a very marked difference—in the quality of some varieties of apples, due to the soil upon which they were grown. As an illustration, take the Swazie Pomme

Grise apple. I think it is not by any means merely imagination on my part which makes me think I can almost tell you the soil on which the tree which has borne the fruit I am eating has grown—that is, within certain limits. Grown on a light sandy soil, it is not nearly as nutty in flavour as it is when grown upon a pretty strong limestone soil. Along the Niagara River I have seen and eaten apples of that variety, which were very fine in flavour indeed. They were a very spicy fruit—perhaps spicy is the word instead of nutty; and yet there is a sort of nut-like flavour to that apple, reminding one almost of a hickory nut, when it is grown upon a pretty strong limestone soil, which gives it a very high quality. I think the trees are longer-lived, grow more uniformly—not so long a growth perhaps in the season—upon a pretty strong clay soil, than upon a watery sandy soil. Therefore I think the trees grown upon such a soil are better calculated to endure the rigours of our climate, especially when we get northward. I do not think it matters very materially what the character of the surface soil is except perhaps during the first years of a tree's life; the roots soon get through that and get into the subsoil. Yet, if I could fix the soil to fit all exactly, I would choose that after you get down pretty well, say two or three feet, the soil should be sufficiently porous to under-drain itself. That is the soil I should like for a healthy growth of apple tree. We all know that a tree which must run its roots into a cold, wet subsoil, will soon become sick, and after a while it will die, so that when I speak of the subsoil I mean the upper subsoil. An apple tree will grow and flourish on well-drained soil of any texture. I have seen it growing upon pretty light sand, and I have seen it growing upon stiff clay; but I think if I were to be allowed to choose between stiff clay and sandy soil, I would choose stiff clay.

MR. LESLIE.—It seems to me that Mr. Beadle has covered the whole ground in the remarks he has made. There is no doubt that a tree having cold feet, as the saying is, cannot succeed well at all. At the same time, I would fear to go to the opposite extreme. Mr. Beadle says that he would like land that drained itself. Well, I remember once that we had a very beautiful field of young trees, which afterwards mildewed and blighted, and refused to grow; and I found, after getting through the surface soil, that they had got down into the white sand. The field was drained so effectually that the sap was drained out of the trees, and there was no possibility of their growing. From my experience in the growth of apple trees, I would say a nice clay bottom with a surface of fine sandy loam was the nicest soil you could possibly have, not only for an apple tree, but for almost any other tree.

MR. WHITE.—Up in the county that I live in, we find that trees bear better and flourish better on gravel with quicksand bottom. The gravel there is perhaps eight or ten feet deep; the roots never go through it. The apple grows very abundantly there, and we generally have a very fine crop. There are more apples grown on that soil than on any other soil that I know of. Still, I have seen very fine apple trees on clay loam. I agree with Mr. Leslie that a cold wet clay at the bottom is not good. I know one man along the lake who has ten acres, and he has shipped as many as a thousand barrels a year.

MR. YOUNG (Trenton).—I have had a little experience in fruit-growing, and it leads me to think that a clayey loamy land—that is, a clay bottom with a sandy top—is a good one. That is the character of my own soil, and the trees are doing remarkably well on it. I notice that on those soils in which there is too much sand the trees do as well for a time, but they do not hold out as well as where the land is a little stronger. But I have not had much experience in these matters.

MR. ARNOLD.—With regard to wet feet, I thought that what Mr. Leslie said covered the whole ground. Neither animal nor plant likes to have its feet in cold water. If I had a choice of a soil for apple trees, it seems to me that I would have a mixture of about half clay and half sand, and then I would get the vegetable food in, in some way, in the shape of manure—old rotted sods to the depth of two or three feet. After that nothing would suit me better than a bed of limestone gravel. I believe that lime is necessary for the growth of trees—you cannot get good healthy trees without it. In our section of the country the bottom is limestone—beds of limestone, in many cases, to the depth of at least 200 feet. As regards the surface soil, a young tree should have the surface clean; nothing should be growing upon it but the apple tree. If it is very young, the

soil can be kept in that condition either by cultivation or by mulching. Some advocate some kind of mulching on the soil; some stir the soil instead; I would not be particular which was done.

MR. SAUNDERS.—With regard to this question of a choice of soil, I think that most farmers buy their farms without considering the fruit subject. As a rule, they omit to make the best use of the soils that they have, and for their encouragement I should like to endorse the remark of Mr. Beadle, that the apple tree would grow well on any ordinary soil, provided it was well drained.

MR. WOODWARD.—My ideal soil for the apple tree would be one in which, at the surface, clay and sand were mixed, the sand predominating; and I would have that growing gradually heavier till I got down about fifteen feet. Then I would like to have that as stiff as possible.

MR. PAGE.—When this question was first mooted, the thought occurred to me, was it in reference to the growth of the tree, or with reference to the fruit after the tree was grown? I find—and I think you will agree with me on that point—that the soil which is just right for the growth of the tree may not be the soil which is just right for the growth of the fruit after it attains its maturity.

MR. SAUNDERS then read the report of the Delegation to the Michigan Pomological Meeting.

MR. BEADLE moved, seconded by MR. BUCKE, That the Report be received with thanks, and published in the Annual Report.—*Carried.*

REPORT OF THE DELEGATION APPOINTED TO REPRESENT THE FRUIT-GROWING AND FORESTRY ASSOCIATION OF ONTARIO AT THE WINTER MEETING OF THE MICHIGAN STATE POMO- LOGICAL SOCIETY.

Your Delegation appointed to meet with our Michigan friends on the occasion of the winter meeting of the State Pomological Society, started for Ann Arbor by early train on Monday, the 6th of December. Owing to some irregularity in the running of the trains, we were delayed on the way, and did not reach our destination until about 10 o'clock that night.

The first session of the Society was well attended, and opened with music. First there was a quartette of horns, followed by a piece of vocal music sung by six voices; an eloquent address of welcome was given by Mr. P. L. Page, and a response by President Lyon; following which was another quartette of horns.

Prof. W. J. BEAL, of the Agricultural College, Lansing, read a paper on the Oaks of Michigan, illustrating his remarks by large diagrams, on which were drawn the leaves, flowers, and fruits of several of the species.

Prof. J. P. STEER, of Ann Arbor, followed with a paper on the Migration of Birds, in which he enumerated the different species of birds found in Michigan, and gave many interesting details relating to their habits, with an account of their migrations to warmer climates during the wintry months.

After a general hand-shaking of the members the meeting adjourned.

Ann Arbor is a very pretty town of about 8,000 inhabitants; the streets are lined with handsome trees, and there are many substantial residences, especially in the suburbs. The Michigan University buildings, which are situated here, are very extensive, and there are at present attending this institution nearly 1,500 students. There is also a very large and handsome Court House, newly built, in which the meetings of the Pomological Society were held. On entering the spacious court room on Tuesday morning to attend the 9 o'clock session, we found a large audience present—from 150 to 200—and this good attendance was kept up throughout all the sessions—varying from 150 to 300—and at the closing session there must have been fully 400 present. Your deputation was very hospitably received, and shortly introduced to the meeting, when we had an opportunity of assuring our Michigan friends of the cordial interest felt by many of our

members in the doings of their Society, and that the desire for a more intimate intercourse had prompted our Directors in sending us to meet them on that occasion.

On looking around the room we were struck with the completeness of the arrangements. On an elevated platform in a conspicuous part of the room was arranged the display of fruit, which was of a most tempting character. The entrance to the hall was tastefully decorated with evergreens; bouquets of freshly-cut flowers were arranged on either side of the desk in front of the presiding officer; while another room was specially set apart for the exhibition of green-house plants. To vary the proceedings, there was a piano, an organ, and several sets of singers and instrumentalists, some of whom gave us excellent music, the musicians being called on several times during each session. In addition to the delegation from Ontario, Ohio was represented by Dr. Warder, and New York by Messrs. Woodward and Hooker; there were also representatives present from Illinois, and many delegates from the Agricultural Societies throughout Michigan.

The first paper on Tuesday morning was by W. W. TRACY, of Detroit, on the Difficulty of Maintaining Good and Pure Seeds.

Dr. WARDER, of Cincinnati, next read an excellent paper on the Ornamentation of Public Cemeteries, detailing at some length the principles which should guide in the planting of such public grounds, and referring to a large number of suitable and unsuitable trees for the purpose.

Tree Pedlars were next discussed and anathematized, and many of their evil ways exposed and vigorously denounced. While it was admitted on all hands that there were some true and worthy men among them who deserved support, there were also a great number of scoundrels, whose only object was to make money out of their unfortunate victims. On the other hand, it was urged that on the whole tree pedlars had been a benefit to the community, and that in a great majority of cases the change from bare barn-yards and other bare surroundings to nicely-ornamented grounds, planted with trees and shrubs, had been effected mainly through the energy and push of the pedlars.

The afternoon was spent in visiting the University, where every attention was shown the members by the professors belonging to the institution. The museum, library, and other points of interest were visited, but most of our time was spent with Prof. Steer—an accomplished and enthusiastic naturalist—in examining his wonderful collections in natural history, made by himself during several years' sojourn in southern countries. In this way time flew rapidly, and soon the shades of evening put an end to sight-seeing. Subsequently we were privileged to visit the microscopical class, where there were some twenty or thirty students, with as many microscopes, studying the tissues of plants, and making beautiful microscopical drawings of their cellular structure, under the charge of Prof. Spaulding and Mrs. Dr. Storrs. We were also shown through the extensive and very complete chemical and pharmaceutical laboratories, which are under the charge of Prof. Prescott, an eminent chemist, and a gentleman widely and favourably known for the distinguished service he has rendered to his favourite science.

During the evening session, Prof. DANIEL B. PUTNAM, of Ypsilanti, read a paper on School Gardening, in which he drew attention to the present neglected condition of school grounds, and the necessity of reform in this direction. He remarked that school trustees cultivate, plant, and adorn their own grounds, while those of the school are left a barren waste. It was argued that beautiful surroundings tend to refine the manners and elevate the conduct of children, and that to cultivate a taste in this direction would give a higher moral tone to schools; that good buildings and well-laid-out grounds were powerful educators.

Prof. WINCHELL, of Ann Arbor, also read a paper on the Climatology of Michigan, and its bearings on fruit culture, which was illustrated by large coloured climatological maps. The advantageous position of Michigan, surrounded as it is by large bodies of water, was dwelt on, and the beneficial lake influences demonstrated by many detailed observations. Lake Michigan alone has a superficial area of 20,000 square miles, and the presence of this large body of water to the west and north-west, over which most of the cold winds pass, and another large body of water on the other side, did much to maintain a moderately uniform temperature, cooling the atmosphere in summer, and much lessening the severity of the cold in winter. The Professor thought that, since the lake

was in some places as much as 900 feet in depth, it was probable that some of the warmth of the water was derived from the internal heat of the earth.

On Wednesday forenoon a paper was read by Mr. S. W. DORR, of Manchester, Mich., on the Danger of Overdoing Fruit Culture in Michigan, which was followed by an interesting discussion, in which many members took part.

MR. SCHUYLER, of Chicago, did not believe there was any danger of overstocking the market with good fruit; a large quantity of green fruit was shipped, which was of inferior quality. If growers would pay more attention to grading their fruit, and ship only that which was first-class, they would realize double the price they now get, and save considerably in freight. The second grade of fruit should be dried, and there is any amount of demand for dried fruit, which can be shipped to all parts of the world.

MR. H. C. SHERWOOD, a large apple and peach-grower in Watervleit, Michigan, believed that if large growers were careful to ship only good fruit, properly branded, so that the public could recognize those which were reliable, they would not be long in seeking out the best qualities, and when found would be willing to pay good prices for them.

JUDGE LAWTON, of Michigan, speaking of the peach trade, referred to the immense number of diseased peaches offered on the markets, gathered from trees afflicted with yellows, and thought that legal power should be sought to enable the various city and town authorities to seize and destroy such fruit, it being unwholesome.

MR. CHAS. ARNOLD, of Paris, Ont., concurred in many things which had been said, and did not think there was any danger of overstocking the fruit market, provided good fruit was offered. He suggested that fruit should be packed with greater care, and that fruit-growers should seek to know the wants and wishes of the customers they propose to supply, and endeavour to grow such varieties as they would esteem most highly.

MR. WOODWARD, of Lockport, N. Y., did not think it was possible to overstock the market with good fruit, and thought that abundant crops and occasional low prices were a great benefit to fruit-growers, as it introduced fruits into families who were usually unable to purchase them, and thus created a taste for fruit, which must lead to an increased demand in future years. He thought that people generally did not use in their own families half the amount of fruit they ought to do; they should have it constantly on their tables, as it was promotive of health. He referred to some fruit houses in Lockport which seemed to succeed well. The process of preservation consisted in surrounding the fruit with an atmosphere of carbonic acid gas, so that the ordinary action of the air in hastening decay was prevented.

MR. J. LAMAN, from the Lake Shore, a large peach-grower, thought that the overstocking of the peach market arose mainly from the fact that growers planted too many Early Crawfords; if they would pay more attention to planting earlier and later varieties, so as to keep the market fairly stocked the season through, the whole fruit crop could be disposed of at reasonable prices.

MR. HOOKER, of Rochester, N. Y., referred to the extensive use of fruit-dryers in his neighbourhood, whereby all the surplus stock of apples was worked up without waste, so that the idea of surplus fruit, or an overstock of it, was not thought of. He stated that their evaporated apples were coming into extensive use all over the world.

Prof. BEAL, of Lansing, Mich., suggested that since there were a great many inferior apples grown, it might be desirable to top-graft them, and in this way the crop of fruit would be temporarily lessened by the withdrawal of the inferior sorts, and that when the full crop was again ripened, it would consist of apples of that desirable character which would command a ready sale.

Following this, a lively discussion was kept up for some time on the relative merits of the different fruit-dryers or evaporators in use, and the more general introduction of small family dryers urged, so that every farmer might be in a position to preserve his own surplus fruits, without incurring the delay and trouble incident to taking them to any of the larger drying establishments. It was also stated that the light colour of the dried fruit was due to the use of a small quantity of sulphur which was burnt, when a powerful bleaching agent—sulphurous acid gas—was given off.

Prof. Cook, of Lansing, read a paper on Insect Enemies and Modes of Fighting

Them, in which he recommended the use of London purple for the codlin worm on the apple, the poison to be mixed with water, and showered on the fruit while young by means of a syringe or sprinkler. The Professor referred to some experiments he had made with this mixture on a Transcendent crab tree laden with fruit in support of his views.

MRS. REYNOLDS, of Ann Arbor, also read a paper on the Origin and Advantages of Association; and Mr. McNAUGHTON, of Jackson, one on the Cultivation and Uses of the Less Common Vegetables.

In the evening, following the election of officers, the several Committees presented their reports—on Flowers, Plants, and Decorations, by W. Saunders; Fruits Exhibited for Premiums, by G. H. LaFleur; Other Fruits, by H. C. Sherwood.

The Committee on Fruits for Premium awarded the prize for the best five varieties of apples for market to the following:—Baldwin, Northern Spy, Red Canada, Jonathan, and Ben Davis—the latter variety being put on this list, not on account of its good quality, but from the fact that it ships so well. Best five varieties for cooking:—Rhode Island Greening, Baldwin, Bellflower, Æsopus Spitzenburg, and Northern Spy. Best five for dessert:—Newtown Pippin, Hubbardson's Nonesuch, Jonathan, Wagener, and Belmont.

The display of apples was excellent, consisting of some 200 plates of the following varieties, viz.:—Baldwin, Yellow Bellflower, Ben Davis, R. I. Greening, Fallawater, Smokehouse, King of Tompkins County, Mother, Jonathan, Vandevere, Seek-No-Further, Cole's Quince, and one or two other old varieties. The apples were well coloured, and very fine specimens. The Yellow Bellflowers were equal, if not superior, to any we had ever seen.

Several seedling apples were exhibited, and one named McLellan attracted considerable attention. It was a very pretty, medium-sized, red apple, strongly resembling Fameuse in size and shape, but of a much brighter red; we did not, however, think it equal to Fameuse in flavour.

The apples exhibited by your delegates received their due share of attention and praise—the Cox's Orange Pippin and Swaizie Pomme Grise being without doubt the highest-flavoured dessert apples exhibited.

There were very few pears shown, and these not of extra size or appearance. The varieties were Lawrence, St. Germain, Beurre Diel, and Vicar of Winkfield.

Only three varieties of grapes were observed, viz., Salem, Rogers' No. 15, and Niagara. The latter were shown by our indefatigable friend, Mr. Woodward, of Lockport, N. Y., and were decidedly the finest in appearance, and will, in time, probably displace the imported white Malaga, and be pronounced by most people superior to that variety in flavour.

In addition to the above-named fruits, there were shown many sorts of dried fruits and some twenty different kinds of fruit jellies, the latter by Miss Fletcher, of Ann Arbor, who gave by request some excellent practical instructions as to their manufacture, and also as to their nutritious and medicinal qualities.

Your Delegation are of opinion that we might, to our advantage as an Association, copy some features from the Michigan meeting. The introduction of music to enliven the proceedings was a great attraction; also the large and conspicuous display of fine fruits in full view of the audience, as well as the ornamental plants and flowers. In these and perhaps some other matters we might follow their example with profit.

We cannot close our Report without referring to the very kind and unlooked-for hospitality of the residents of Ann Arbor in freely opening their houses to entertain the visitors and strangers, who were so cordially received as to be made to feel perfectly at home wherever they went. We shall always look back to our visit to Ann Arbor with pleasure.

WM. SAUNDERS.
CHARLES ARNOLD.

GRAPES.

A discussion then ensued with regard to grapes, the President calling on Mr. Beadle to introduce it.

MR. BEADLE.—I hardly know where to begin on this subject; but perhaps I may start with varieties of grapes. There is one grape in particular that I had my attention called to by one of the members, who at exhibitions showed it among the early grapes—the Janesville. I published a letter from him in the *Horticulturist*, and that has called out some other remarks in regard to that variety. I do not know anything about the Janesville personally; but I got the impression a long time ago, from those who had grown it, that it was a grape of inferior quality—ripening early, to be sure, but of such a character that if we could get another grape to ripen about as early, ten to one that we would get a better one. I have never planted it, and therefore I cannot speak from personal experience of it. The earliest grape with me for some time past has been the Hartford Prolific, but I never thought very highly of it. It had a good many faults. It dropped badly from the cluster; it had not a very high quality—rather a tough pulp. However, it would sell, because it was pretty early. Then there came to my notice next after that a grape called the Champion, which was earlier still than the Hartford Prolific—in fact, so far as my own grounds are concerned, it was the first to ripen. It would sell at from fifteen to twenty cents a pound in the market on account of its earliness. But I quite agree with a remark that I heard a gentleman make, that there was but one fault to find with the Champion, and that was this, that it was good for nothing when you got it. Yet were I living away up at the North Pole, or somewhere where the Champion was the only grape I could get to stand the climate and to ripen, I would probably plan it because I could not get any better. To my taste it is a very poor grape—very poortin flavour. Some of my neighbours planted it, and for quite a while did very well with it; but they came to the conclusion that they must take it up and plant something else, because they only got two or three days' sale of it before some other grapes were brought into the market from farther south that knocked it endwise. The next variety that ripened with me was Moore's Early. I have tried it for two or three years, and I find it ripens about the same time as the Champion. In point of quality I call it as good as the Concord; some say it is better. I am hardly prepared to call it better; but I do not hesitate to say that I call it as good as a well-ripened Concord, and that is not a bad grape. I have not fruited it in quantity enough yet, nor have any of my neighbours, to enable me to tell how it will take in the market; but for whatever time we may have an early grape in the market before it gets into competition with those from farther south, I am inclined to believe that Moore's Early will take a place before any early grapes that we have thus far had. The next grape in ripening that I have had my attention called to, is this one at Lockport, which no one has got but the Lockport people, and which they are determined, I believe, no one shall have but the Lockport people. That grape, I find, ripens about with the Hartford Prolific. I so find it, not that I have fruited it in my own grounds, because I have not got a vine of it, but I was over at Lockport last year about the time that the Hartford Prolific was being gathered for market, and ate of that grape then, and preferred it to the Hartford Prolific. I saw it two or three weeks later this year, and it had improved by ripening. Whether it keeps improving until the frost comes and takes all the leaves off I do not know. It has a good eating quality when the Hartford Prolific begins to ripen, and I believe it would be preferred to the Hartford Prolific, sent to market with it. There are some other new grapes that I do not know much about. The Duchess grape and the Pocklington grape I do not know anything about only from having seen them at exhibitions. They are white grapes, and from what I have seen of them I think they are grapes of a good quality. As to their time of ripening I cannot say anything. About the time that the Hartford Prolific begins to get ripe, some varieties of the Rogers begin to get ripe also. There is the Massasoit, the No. 3 if I remember right. The clusters on it are not very large; some of the bunches are very fair, while a great many of them are small. The berries are very good. That variety, like all the rest of the Rogers grapes, is best when just ripe; if the fruit is

left hanging on the vines till dead ripe, I do not like it ; it loses very much of its sprightliness. Then there is the Wilder, Rogers No. 4, and Rogers No. 15, another red grape, which I like very much. They get along about the time that the Concord becomes ripe. I like the Concord fully as well as I do any of these Rogers grapes. No. 15 I think I like the best of any of the Rogers grapes I have eaten. It has a peculiar flavour : I suppose it has some of the native flavour toned down. It reminds one a little of some of the Muscat grapes of Europe. Not that the comparison is a very happy one. It is more liable to mildew than most of the Rogers grapes ; yet I find they will all mildew more or less—some one season, some another. This last season has been a very bad one for these Roger grapes mildewing about St. Catharines. I have said nothing about the Delaware. You are all familiar with it—a very small grape, but a grape of good quality, and a very pleasant-eating table grape, used somewhat for wine. About making wine I do not know anything. Coming down among the later ripening grapes, I value the Iona very much—if I could only always ripen it ; that is where the rub comes. There will be seasons when I cannot ripen it. I consider that grape just about the very best for flavour that we have ; and if I could get it to ripen about the time of the Champion, the Hartford Prolific, or even the Concord, I would be perfectly satisfied—I would think I had the *ne plus ultra* of grapes. Of course I would want it to stand the climate well. I am now just speaking of the quality of the grape. Among the more acid grapes, the Clinton is one that I value because of its keeping qualities when it is fairly ripened ; and it always ripens with us—I do not know that it ever fails unless it has been allowed to overbear so that it cannot ripen. It is prone to bear very heavily. I find that it will keep if you just lay it in a cool place. Put it away on a shelf, on a dish—you need not pack it at all ; only put it where it is cool and dry. I generally put them up in my attic, and they keep there until this time. I think they improve by being kept ; the tartness tones down until at this time of the year, if you are fortunate enough to keep any till this time, they are just a nice, sprightly, fresh-flavoured grape. They do not cloy ; there is not so much sweetness about them as to make you tired of eating them. They are always juicy, sprightly and fresh. Since I published in the *Horticulturist* an article in regard to the Burnet grape, I have received several letters about it, most of them saying they think we have made a mistake as to it—one that it is not hardy enough to be grown in more northern sections of the Province. Others say that even when it is grown it is only fit for the amateur. The skin is very tender ; breaks so that you cannot carry it to market ; and it has several other defects—I forget what they all are now. I will publish the letters I have received giving the testimony in regard to it.

MR. GILCHRIST.—This season in Guelph has been the most favourable I have known for twelve years. We have ripened the Clinton this year quite successfully, and we have not done that for ten years before. There were no June frosts to interfere with the grape, and consequently we have had a nice crop of them this year. Mr. Benham has been trying to grow grapes for forty years, and has been more successful this year than any year yet. Last year he ripened the Champion, which was the first grape he ever ripened ; but I think he planted wrongly. He planted up against his barn, where the sun always strikes, and it was very soon in leaf in the spring. At the Model Farm they have planted grapes, and they have ripened for three years. They have planted them where a current passes through, and in that way they have been more successful than those who have planted against the wall.

MR. CROIL.—We find the Hartford Prolific the earliest grape with us. The Delaware and the Clinton ripen with us very well.

THE PRESIDENT.—The Concord, in our section of the country, is a perfect failure ; I have never had a vine of that sort succeed yet.

MR. BUCKE.—I had hoped that when our esteemed Secretary got on his feet to say a few words about grapes, he would have said something about the Burnet grape when he was dealing with the excellencies of the Iona.

MR. BEADLE.—The reason I said nothing about the Burnet was, that I have never eaten a bunch of the Burnet in my life. I have not yet fruited it.

MR. BUCKE.—I got a Burnet grape from the Association, and I can speak very highly of it. It has been fruiting now with me for the last two years, and this year it

had a very heavy crop on it—so heavy, in fact, that I had to remove a great many bunches from it. I think I never had a grape that grew so well as the Burnet. It was fully fifteen feet long, and it was about three years ago that it was sent out. Not only did the Burnet grape bear, but I had some layers from it this year that bore also; and I find it is one of the strongest growing grapes we have. I think the flavour of it is all that has ever been said about it by the Fruit Growers' Association. I consider it is a very great acquisition to the country; and I am perfectly satisfied that the more it is tried the more people will like it. Of course you cannot expect a young vine to fruit as well as an old vine, or to ripen its grapes, perhaps, as early; but I claim that the Burnet grapes will ripen quite as early as the Concord; and they are a long way ahead of the Concord in flavour. The Burnet is certainly the best-flavoured outdoor grape that has been grown in Canada to my knowledge. There have not been a great many fruited about Ottawa; but all who have fruited it are very much pleased with it. This has been an exceptional year for grapes; but I hope that in other years the Burnet will ripen as well as it has done this. It is so very thrifty that care will have to be exercised that too many branches are not allowed upon it.

MR. BEADLE.—How hardy do you find the vine?

MR. BUCKE.—The Secretary talks about hardy grapes: we do not know what people mean by a hardy grape, unless it is one free from mildew. All grapes are hardy with us in Ottawa. Even the indoor grapes, if they are covered with soil, escape injury by frost in Ottawa. Although I have heard the term "hardy grapes" often used, I never could make out what was meant by it. The wood always comes through the winter well when it is protected. We cover all grapes. We always put from three to six inches of earth over them, and I have never lost any by frost yet. I have a Creveling which I consider quite as early as the Hartford. I do not think anything at all of the Hartford; I think it is a miserable thing. It ripens pretty early; but as soon as it ripens it drops; and it will not do to cut a bunch of grapes off the vine before they are ripe, because they will not ripen like an orange or an apple. We consider the Creveling a good grape. The only objection to it is that it does not set very well; still, it gives good bunches. I have a Lindley, and I esteem it very highly. It is a very good bearer, and it is a very nice grape. It ripens fully as early as the Concord—I think a little earlier. We have the Champion down there also, and we do not think much of it. It is early, and of course it is a good grape to sell, and people buy grapes without knowing much about them. I have the Othello, and it produces perhaps the biggest bunches of any grape grown at Ottawa. It is not an early grape; it requires the frost to bring it to perfection. It bears a very heavy crop. I have also the Eumelan, which was sent out by the Association. That is also a very fine grape; but, like the Creveling, it does not set well. I also have the Miller's Burgundy. It is a foreign grape—no cross of any native grape in it. It is one of the nicest grapes to eat that we have; but it sets so that unless it is thinned it is of no use. Still, it is a very fine grape; and I think everybody ought to have a vine of it. It is also an early grape; it is very nearly as early as the Champion. It is a very fair grower. I think it would be a very good grape as a parent to hybridize from. It has all the qualities of a foreign grape; it is thin-skinned, has no pulp, and is very sweet. It is larger than the Delaware, although it is not a very large grape, even when it is thinned. I find my grapes all do well. I do not find any variety more tender than another.

MR. BEADLE.—In this climate we are not in the habit of taking down our grape vines in the fall and burying them. I suppose ninety-nine hundredths of our grape growers leave their vines on the trellis all winter. I mean by a hardy grape vine one that will remain on the trellis all winter, and grow the next spring—not be dead. I have seen the Isabella, which we ordinarily esteem a hardy grape, so badly injured by the frost that half the buds would not break in the spring. I mean by a hardy grape vine one that will bear the winter, and the buds of which will start in the spring—very near to the ends of the vine, at any rate, if not entirely to the end. Most of these foreign vines, such as Miller's Burgundy—although Miller's Burgundy is perhaps as free from that as any—succumb after a year or two to the mildew. They do not seem to be able to stand our summer. I do not know what is the reason; but the mildew attacks the foliage; and once the

mildew has gone through the leaves pretty generally the wood is not ripened, and when the wood is not ripened it will not stand the winter. Sometimes, however, these foreign grapes will stand for one, two, three and four years, and produce good crops of fruit. I have seen enthusiastic Europeans bringing over those grape vines with them, and they have told me what good grape vines they had got; but all these beautiful foreign grape vines—and to this I have never known any exception in our climate in the County of Lincoln—are sooner or later attacked with mildew or disease of some other sort. I have a Miller's Burgundy which grew over my smoke-house, and though latterly the smoke-house has been removed the vine is still there. There is a Privet hedge near by, which it runs over; and some years it matures, and some it does not; it matures about every other year. When it does mature I get a pretty fair crop off it. The foliage is comparatively free from mildew, but the fruit becomes mildewed.

MR. ARNOLD.—I used to cultivate Miller's Burgundy, and thought very much of it; and although it is considered a foreign grape, it is quite different in foliage from any foreign grape that I know of. It never mildewed in the foliage with me, but mildewed very badly in the fruit, and was so thin in the skin that the wasps punctured it very badly. I think it is one of the finest grapes that can be used for pollen to be placed on some other grape. If I were going to cross again, I would prefer Miller's Burgundy to any. I would like, if we had the power, to annihilate some grapes, and the Hartford Prolific is one that I would put out of existence if I could. It is a grape that promises all the year till you are going to pick it, and then it is on the ground. There is another grape I would like to put with it—that is, the Northern Muscadine; and another is Perkins's. These grapes have no redeeming qualities. Rogers' No. 3 is quite as early with me as the Hartford Prolific.

MR. SAUNDERS.—There is no accounting for tastes. There were some friends in my garden this summer; there were Northern Muscadine, Iona, Concord, Delaware, and some other varieties of grapes growing there; and I was surprised at these friends going for the Northern Muscadine—they thought they were the best grapes of the lot. It has a strong rank flavour, and I fully agree with Mr. Arnold that any person whose taste is cultivated in regard to grapes would not want to eat it. With regard to the Janesville, mentioned by the Secretary, it bears a good crop every year; it is early, and is a fair quality of grape. I have not had an opportunity of comparing it with the Champion; but I should think it was a great deal better than the Champion, from what I know of it. I was favourably impressed with the grape as a grower and cropper, and also as to its quality. As far as quality is concerned, if I was to have my choice of all the grapes I know to eat, I would take the Burgundy in preference to any other, although it has been a slow grower on my ground. I think that of all the grapes that have been introduced for many years the Burgundy stands at the head for flavour, in its freedom from pulpiness, and in that very nice combination of acid and sweet that it has. Next to the Burgundy I would place for my eating the Canada, when it is sufficiently ripe. But, as I said before, there is no accounting for tastes; and my taste would perhaps not coincide with that of many gentlemen present. I like a grape with a little acid in it. I would rather eat the Clinton when it is fully ripe than the Delaware; I think there is more character in it. The Eumelan has done very well with me, but I think it is a poor quality of grape. It is not a good grower, but it sets fairly well. The Creveling I think very highly of; and although it sets its bunches rather poorly, yet it bears so many of them that on the whole you get a very good crop off a vine of that variety. I think it is among the pleasantest grapes to eat that we grow. I have tried the Burgundy grape Mr. Bucke speaks of, and with me it has been a very slow grower. It is very short-jointed in the wood, and seems to retain its foliage very well, and perhaps it may turn out better in a year or two. Iona does not ripen well in our latitude, and for that reason I have never thought much of it. I was surprised to hear the Secretary speak of it being so high flavoured. I have never had it develop enough, perhaps; but I thought it a watery grape. The Seneschal I have never fruited; but I have eaten it during this year, and I think if it is hardy enough the matter of its being thin-skinned won't prejudice people against it, because we want grapes for the amateur as well as for market, and the largest proportion of our members are persons who grow their fruit for home consumption. Another grape that I like very

well is the Brant. It has fruited now with me for two years; and it has a pleasant acid flavour somewhat similar to that of the Canada, but I think is hardly so sprightly. It bears a long bunch, and fruits very well. The Rogers' Hybrids have been a failure with me during the past year. I think the No. 15's mildewed about as badly as any—or perhaps the Salems the worst of all; they have all mildewed badly. If we had many seasons like last, I do not think the Rogers would remain in fashion for many years. It was not only in my vineyard that this was the case, but in all the vineyards around London. I do not lay any of my vines down in the winter.

MR. WOODWARD.—We have got a great many new grapes with us, and a good many I regard very highly. I was glad to hear the testimony of the Secretary to the merits of the Moore's Early. I think of all the black grapes we grow in Western New York, I regard the Moore's Early as the best. The Champion we only grow as a curiosity. A friend said to me once, "There is one good thing about the Champion, and that is that the birds won't eat it." Anybody with a human taste would prefer the Moore's Early to the Champion. There is one grape that has been mentioned here that we regard very highly, and that is the Brighton. It is a Hybrid grape, and we think that all Hybrids want to be treated differently from those that are purely native. Where the Brighton will succeed it will please almost everybody's taste. You want to eat it when it is ripe; by hanging on the vines it becomes rather pasty. I do not think one would be safe in planting the Brighton largely for a market grape; its propagator does not claim it to be a market grape. In the first place, Mr. Moore crossed a Hamburg and the Diana, producing a grape that was a good deal too tender for our climate. Then he crossed that Hamburg-Diana on the Concord. It will succeed with good care in a great many places. The Ulster Prolific and the Poughkeepsie Red are good grapes. The Poughkeepsie Red is about as good as the Delaware. These are both seedlings from the Delaware. Of the white variety I never saw a finer show than was made in Mr. Ricketts' grounds this year with the Lady Washington; and he is not a very good cultivator either. His grapes were not receiving very high care; but this variety looked very well, and if it proves to be as good everywhere as there it will be a good grape.

MR. BEADLE.—Does it seem to be subject to mildew?

MR. WOODWARD.—It was not mildewed there, but it was on a high sloping hill. I saw no grapes on the Hudson this year that were mildewed. The Lady Washington is about as early as the Concord—perhaps not quite as early. I do not believe its parentage is properly stated. Mr. Ricketts claims it to be a seedling of Allen's Hybrid with the Concord; but any man who saw a cluster of Lady Washington and a cluster of Montgomery side by side would be willing to swear that it had Montgomery blood in it. I have seen clusters of them that you could not tell apart. I saw the Duchess on its own ground, and it did not make as good a show there as I saw at other places.

MR. BEADLE.—How does the Duchess ripen as compared with the Concord?

MR. WOODWARD.—About the same time—not any earlier. They say they have had a very dry season on the Hudson River, and that that accounts for its not presenting a better appearance. I saw the Duchess in several places where it looked very much better. I saw the Prentiss growing, and I thought very highly of it. It produces a fine cluster—not very large, but of a very good quality. It is not any earlier than the Concord, but I would not like to say it is any later; I do not know enough about it. The Pocklington I have not seen in bearing myself. I have seen the fruit in several places; but I have not seen it on the vines. I do not think it is as early as the Concord. When we were at Albany, at the State Fair—which was from the 13th to the 17th of September—right close by there was a gentleman showing grapes who lives near Mr. Pocklington. I was surprised at not seeing the Pocklington grape there. I expressed that surprise to this gentleman, and he said: "It is no wonder to me; it is not ripe." And he was showing grapes from very near that vicinity.

MR. PETTIT.—The varieties that I have cultivated chiefly have been the Concord, Diana, Delaware, Brighton and Champion. The Champion is a grape of a quality that I do not consider extra at all. Its earliness is its main feature. I have fruited the Pocklington this year for the first time. It gave me two bunches of very nice grapes, and they ripened quite early, I think earlier than the Concord. Of course it is a very

young plant; this is its second year. I fancy the fruit will ripen earlier as the vine gets age. I consider the fruit very fine—indeed, extra. I have not noticed the Pocklington fall any; we scarcely gave it a chance to drop any. Quite a number of my friends were at my place, and we devoured them; they were thoroughly ripe.

MR. MORRIS.—The Secretary speaks of the Rogers 15 as the best of the Rogers'. I would differ from him there; I would place No. 3 as the best. And as for the Iona, which he speaks so well of, I do not think it is worth room. I have a great many vines of it; and I get so little fruit and so few bunches that I have dug most of them out. The Seneschal bore with me this year, and the bunches are very fine in appearance; but I think the quality is very bad. In point of quality I would put the Brighton first of all. I think it is the best grape I have tasted; and that is the character I have got of it from most American grape growers I have talked to. With regard to the Pocklington, of course I am interested in that, and do not want to say much about it; but I will say this: it is a grape that has been run down very much by parties interested in other new grapes; at the same time I believe it has carried off more honours at leading Horticultural Exhibitions than any other new grape out.

MR. SAUNDERS.—What time does it ripen as compared with the Concord?

MR. MORRIS.—On Mr. Charlton's grounds, in Rochester, it ripened about the same time as the Concord. It ripened there a week earlier than at Sandhill, its own grounds.

MR. WOODWARD.—The Niagara was never yet entered for premiums at any exhibition.

MR. WELLINGTON.—The Brighton is, I think, a grape that is hardly good for the shipper; but is rather one for table culture by the amateur. I think it has no equal as an outdoor grape. As to hardiness, I think it will stand very closely alongside the Champion. Another new grape which has not been mentioned is called the Early Dawn. I have not seen a great deal of it, and am not interested in it; but I have noticed that it is very early, and of good quality. It is something like the Brighton as regards thin skin and lack of shipping qualities. But the main point to be decided now is as to its hardiness; that is the test that is applied to most of the new fruits that we are bringing out now. There was a remark made about the Pocklington not being shown. This year Mr. Pocklington met with the misfortune of having all his grapes, or nearly all, destroyed by a severe hailstorm, so that there was nothing left but a few small clusters, and he was unable to make any display. Mr. Pocklington is under the disadvantage of ripening his grape in a section of country not adapted to fruit culture, while most other new varieties are brought out in a section favourable to them, and are thus given a chance. The Pocklington fruit that has been shown, has been shown at a disadvantage on that account. This season for the first time we ripened the Pocklington in a favourable locality, in Mr. Charlton's grounds, and it ripened alongside the Concord a few days earlier than it was fully ripe. It hangs well, does not drop, and is a good keeper. I ate Pocklington grapes two years ago, late in the season, after the snow fell, and they were then sound and of good flavour. The vine I consider as hardy as any of the vines that have yet been put out. I think it will stand any place that the Champion will. The place where it originated is a good test for it on that point.

THE PRESIDENT.—I fancy that I have been perfectly successful this year in grafting grapes; so much so, that when I pulled one vine up—a Brighton grafted upon one of Rogers' Hybrids—I found that the graft had so completely taken that you could scarcely discern where the union was. The secret of success in grafting grapes lies in one thing that we must do, and that is, lift the vine that we are going to set the scion on, and then set it back again. This appears to check the flow of sap that drowns the graft. You may depend on perfect success if that is properly done. Every scion that I put in last year not only lived, but grew well. I would rather have a good cutting with one eye than have two poor vines. With respect to varieties, I think very much of the Brighton grape; but if it is just ripe to use to-day, you must not leave it till to-morrow. It deteriorates in flavour very quickly. It appears to have a dryness, a lack of sprightliness, when it is a little over-ripe, or, as we term it, fully ripe. It is sufficiently early with us. I have never been in the habit of either praising the Burnet grape or running it down. I have originated the vine, and I have been willing to allow it to stand on its

own merits. On my grounds there has never been a grape that would compare with it for a moment. This is the first year that we have ever placed any quantity of the fruit of it in the market; and although it has been brought into competition with Delaware, with Concord, with Brighton, with nearly all of the Rogers' Hybrids, and with many other fine grapes, I think I am perfectly safe in saying that it commanded fifty per cent. more in Belleville market than any of them. The first grapes in the market were the Champion and the Hartford Prolific; and the people had become so satisfied with grapes when these were gone that they did not want to see another black grape. The first few bunches that we put in the market they would hesitate about buying; but as soon as they commenced tasting them, there was no difficulty at all in getting fifty per cent. more for them than the others brought.

MR. ARNOLD.—Years ago I used to graft grapes in various ways; and I have put little pieces of cutting—no matter what kind—on a little piece of root, put that in the hot-bed, and there was no difficulty whatever about growing them. I have sometimes found that when you stick one graft into each root there is such a flow of sap that it kills it; but by putting several grafts in a large root I have no trouble.

THE PRESIDENT.—In our section of the country any boy ten years of age appears to understand grafting; and we graft the grape the same as we would an apple, pear, peach, plum or any other variety of fruit—whip-graft it. We take off a stub, split it, sharpen a scion, and put it in just the same as you would in stem-grafting. You can just graft it as you please; only the union should be placed beneath the surface. I have tried without wax and with wax. I used cotton covered with wax, the same as the nurserymen use, when I whip-grafted; and some I grafted with just matting, and I could not see any difference. I took the vine I grafted entirely up when I was grafting it. If I were going to graft a new variety that I was just going to make a cutting of, I would take a vine of a strong, healthy-growing variety, lift it out of the ground, preserve all the fibrous roots possible, and after setting the graft, plant again.

A MEMBER.—In the same place?

THE PRESIDENT.—Oh, where you like; it does not matter. I think where a nurseryman gets a large lot that are unsaleable, it would pay him to graft on them.

MR. ARNOLD.—I pay no attention to the bark in grafting grapes. The sap of the grape vine, as I understand it, rises all through the vine. My method has been, if I have a large vine two inches through, to cut the roots off here and there all round it, and stick in a scion to every root. You check the flow of sap by putting in so many grafts; and I think that by tying it with a good strong string in the fall, nine out of every ten of them will grow. If you cut the roots off a long distance from the original stock, you will not be troubled with the suckers of the original vine.

MR. BUCKE.—Mr. President, there is one remark you made that I must take exception to. You say the Burnet grape is the best market grape to have; I find it the poorest, for the simple reason that they like them so well at home that I never get them to market at all.

MR. GILCHRIST.—I have seen the grape budded in the fall very successfully. I bud before the leaves fall.

The meeting was then adjourned till the next morning at nine o'clock.

Wednesday, January 19.

The meeting was called to order at 9.30 o'clock.

MR. A. M. SMITH read the following report of the Committee on Fruits on Exhibition:—

Your Committee on Fruits on Exhibition beg to report as follows: Charles Arnold, of Paris, shows five varieties of his hybrid seedling apples: No. 1, an apple of the Spitzenburg flavour and size, but more like the Baldwin in shape and colour, but is somewhat russeted, which mars its appearance; very good in quality. The Ella, another apple something of the same class, which has been before described by com-

mittees of the Association. A sweet Russet, of no extraordinary merit. Fine samples of the Ontario, which will fully sustain the reputation given it by the Association. Also, fine samples of Arnold's Beauty, which is indeed a beautiful apple in appearance, of a mild sub-acid flavour. Thomas Beall, of Lindsay, shows good samples of Yellow Bellflower, Snow, Golden Russet, and Grimes' Golden, which show that good fruits can be grown in that section. A. H. Pettit, Grimsby, shows Strawberry Pippin and another red apple, name unknown; also, beautiful samples of the Northern Spy. A. M. Smith shows the Grimsby Beauty, a beautiful apple in appearance, somewhat resembling the Maiden's Blush. John TenEyck, Grimsby, shows a large sweet seedling apple of good flavour. W. T. Pettit, Oakville, shows a small dark red seedling apple, very beautiful in appearance and fair in quality, which would doubtless sell well in market. P. C. Dempsey, Albury, shows the Winter Peach, a large apple somewhat similar to Gloria Mundi, but not quite as large. Also, five varieties of winter pears, Beurre de Gheline, Bergamot d'Esperin, Doyenne de Hiver d'Alençon, Beurre Gris de Hiver and Josephine de Malines—the latter a pear of very great excellence for a winter pear.

A. M. SMITH.
A. H. PETTIT.
E. MORRIS.

Mr. HOLTON moved, seconded by Mr. ARNOLD, that the report be received.—*Carried.*

Mr. WOODWARD.—If it be in order, I would suggest to the mover of the resolution which was offered and passed yesterday with regard to packages for fruit, that he move that that matter be reconsidered, and that then the committee be instructed to act in concert with any committee that may be appointed by the Western New York Society and by the Michigan Society, so that, if possible, we may secure a uniform size in the packages. If they would establish a uniform size for the apple barrel, that would be the end of it. We have continual warfare on our side with regard to that. It is claimed on the one side that it is too large, and on the other that it is too small; but I think the dealers, the fruit growers, and all would be satisfied if a uniform size could be adopted.

The PRESIDENT.—I cannot see that it is necessary to reconsider that motion, but only to give that committee instructions to act in the matter. Another resolution is all that is required.

Mr. ARNOLD.—It is very annoying to a man when he is buying apples to have one person sending him only two bushels and three pecks for a barrel, while another sends him three bushels. It is not only so with regard to apples, but also with regard to potatoes.

Mr. A. M. SMITH moved a resolution that the committee act in concert with any committee that may be appointed by the Western New York or by the Michigan Horticultural Society, which was carried.

REPORT OF COMMITTEE ON VEGETABLES.

To the President and Members of the Ontario Fruit Growers' Association:

Your Committee appointed at last winter meeting beg to report the result of their labours, as follows:

The magnitude of the work before us, were we to go into researches connected with all the different varieties of vegetables, was at once seen, and knowing that we could only give a certain amount of time and study, have devoted ourselves to a general view of the subject, which we place before you, hoping it may serve to inspire further thought and study upon this important feature in our agricultural productions. No dinner table can now be said to be complete without a good array of vegetables, although, to a great extent, their quality has been overlooked by many housekeepers in their selection of these valuable additions to their tables. Watery, solid potatoes, stringy turnips and beets, with tough and woody parsnips, are among some of the unwholesome dishes people are treated to, in which case the cook generally gets the credit of having little

knowledge of her work, while at the same time the fault lies in the quality of the vegetables themselves, which quality is due, not alone to the particular variety of each, but to the soil upon which it is raised and its manner of culture. This being a fact, it will not seem out of place to urge upon agriculturists the importance of a more thorough study of vegetables, the method of culture that will tend to develop their best qualities, and the varieties that experience has proven to be the best.

We will draw your attention first to what is the leading and most valuable vegetable grown—the potato. This valuable and well-known esculent is a native of the mountainous parts of tropical America: was taken to Spain and Italy in the sixteenth century; in its wild state it was not more than about an inch in diameter, with insipid flavour and quite unpalatable.

The first varieties used in this country came from Europe; the quality was then very poor, but now, by cultivation and the production of new varieties, by planting the seeds, by grafting, by hybridizing, etc., it has become of excellent quality, and an indispensable article of food.

By its valuable qualities, and its general consumption everywhere, the potato ranks in nearly all countries as a leading food staple. It may, therefore, be discussed with interest and profit. There may be some other crops grown on a larger scale, yet no product of husbandry is more variously useful, or more generally raised by farmers, and none, if we except wheat, more universally consumed by the people. This being the case, it follows that there is much importance to be attached to the culture of this crop. The average yield of potatoes in this Province is less than one hundred bushels to the acre, although six and even eight hundred bushels have been raised off an acre of ground. No crop, perhaps, appreciates good cultivation and soil more than the potato, which will be seen from the fact that while the average yield is not over one hundred bushels, it is possible to raise eight hundred. It is said that the man who will make two blades of grass grow where but one grew before, is a public benefactor; we say, then, that the man who can make eight hundred bushels of potatoes grow where but one grew before, is also a public benefactor. Not only is the potato a good article of food for the human family, but it is valuable as food for domestic animals as well. At the late Centennial Exhibition at Philadelphia, there was a collection of 500 named varieties of potatoes exhibited; out of these, however, there are comparatively few varieties which it is necessary for farmers to attempt to raise. In this Report we propose only to notice some of the leading and new varieties, and in doing so give you such information as we have been enabled to gather from observation and study, together with what we learned through the experience of leading potato growers, and will attempt to describe accurately each variety noticed, besides presenting samples.

Alpha.—A seedling from the Early Rose; tubers of medium size; oblong; somewhat flattened, with eyes slightly depressed; colour, a clear white with a slight tinge of red about the eyes; flesh very white; fine grained; dry and firm, with flavour decidedly excellent: is good any time through the year when still green and growing; stalks short and close-jointed, seldom exceeding a foot in height; leaf broad, light green, with a glossy upper surface; tubers cluster at the base of the stalk. The Alpha has been awarded the highest honours both in Britain and the States for general excellence: it has been thoroughly tested in Canada, and succeeds well. It is, however, not very productive. Mr. J. H. Rowe, of the Township of King, in the County of York, has grafted it into the Burbank Seedling, which is both a very productive and fine potato, and he hopes to obtain from this union a valuable potato for general cultivation.

Bresée's Prolific.—Vines medium height, bushy and spreading; tubers large, regular and smooth, slightly oblong and somewhat flattened; colour a dull white, inclining to russet; eyes slightly depressed, and containing a pinkish tinge; flesh white and firm; it cooks quickly; is very mealy, and of excellent quality; matures about two or three weeks after Early Rose, but is not so prolific as was at first claimed.

Beauty of Hebron.—Appears to possess almost all the requisites for a first-class potato; it is very early, about a week before Early Rose, and ten or twelve days before Snowflake. Its growth is rapid and luxuriant—so much so that the Colorado beetle has usually but little effect in checking its growth; the tubers, shaped like Early Rose, are

smooth, slightly tinged with pink around the eyes, which turns a pure white in winter; flesh solid, and so far has shown no tendency to rot; the yield is enormous, the tubers lying closely together in the hills; when cooked they are mealy, and of rich delicate flavour. It has been well tested, and the reports from all quarters are so assuring that we have no hesitation in concluding that this variety will very soon supersede the justly popular Early Rose. The only point that can be mentioned thus far against it is a tendency to grow knobby in strong land, but even this can be overcome by carefully selecting the seed.

Burbank's Seedling.—A seedling from the Early Rose; tubers large, long and slim; eyes few, and slightly depressed; flesh white, fine grained; dry and floury when cooked. It is very productive, and commands a high price in the market, owing to its general good size and fine appearance. Is not early—at all events not so early as at first claimed.

Blue Pink Eye.—Is an old variety coming into cultivation again in some sections; it succeeds admirably on new land, but is apt to run out unless seed is frequently changed from opposite soils.

Blue Kidney.—Stem upright and compact, about two feet high; tuber medium, and slightly curved; colour very dark-bluish purple, with fair flavour. The kidney family are apt to run out soon, and often succeed best in dry seasons.

Brownell's Beauty.—A large handsome potato; oval, red; clusters closely around the stalk in the hill; easily dug; is a good cropper, but not generally popular for the table.

Bermuda.—A new seedling, which is not likely to find its way into the market. It is not worthy of general cultivation.

Black Heart.—An English variety; is being tested in Ontario, but thus far has not given promise of superiority.

Brownell's Superior.—Is a sure cropper; its tubers are medium to large, elongated, oval or cylindrical; colour dark, or copper colour; very uniform and handsome in appearance; skin very smooth; eyes few and small; veins strong and healthy; it ripens late. Not a desirable potato for table, but excellent for cattle.

Buckeye.—Is being introduced into some sections as a new and very excellent variety, but it is an old variety and has nothing to recommend it for cultivation.

Compton's Surprise.—Oval oblong, with eyes sunken, brow prominent, colour reddish purple, flesh white and sound. Mr. Rowe reports this as a truly *surprising* variety; he says that the last spring he planted eighty sets and only three came up, and when he peeled them for use at least half the potato would be wasted. Others place it at the head, and as first-class in quality and production. Wants good soil.

Climax Early.—Uniformly large, long, cylindrical; skin white; eyes sharp, shallow; flesh white and firm; early, prolific and hardy.

Centennial.—Upright vines, strong, vigorous and medium height; foliage dark green, strongly resembling the leaves of a raspberry; tubers are compactly clustered around the stalks; easy to dig; medium and uniform size; shape nearly round and somewhat flattened, never rough or prongy; eyes few and of a deep red colour; medium early; flesh fine in the grain, white, and when boiled or baked of a lightness and purity seldom equalled, but is not at all prolific.

Calico.—Upright stem, nearly three feet high; tuber round and slightly flattened; colour light brownish-red, with a small portion of white near the stalk; mealy, medium flavour; fair cropper, but would not recommend it for cultivation yet, until better tested.

Carter's Red Skin Flour Ball.—A heavy cropper; answers well for late use and winter; keeps finely; seems to be free from all disease; quality fair; it has not yet been tried on a variety of soils or sections of Ontario.

Canada.—Medium tuber, oval; stem about two feet high; cooks well, but a poor cropper; it is a hybrid, and will likely never be of value for extensive cultivation.

Dunmore.—A new seedling from Vermont; white skin and white flesh; it has been represented as extra fine in its native place; of large yield, large tuber, floury and good in quality; in appearance it resembles the Peerless; it has not yet been sufficiently well tested in Ontario to warrant us in recommending it to any one, but by another season we may be better able to speak of its standing in this Province.

Early Rose.—Was the first of Mr. Bresee's seedlings; it came out in 1868, and has

been the standard for earliness, quality and productiveness from that time down to a year or two ago, when we began to hear of complaints; the fact is now evident in many sections that it has seen its best days. It certainly has been the potato for the million, but is failing.

Early Ohio.—A seedling of the Early Rose, and similar in colour and generally, excepting in shape, it being a round oblong; it is several days earlier and more productive than the Early Rose; quality fine; thus far reports are nearly unanimous in giving it a high recommendation for more extended cultivation.

Extra Early Vermont.—Resembles the Early Rose in many ways; is earlier by ten or fifteen days; fully equal in quantity, and a good cropper on rich soil.

Early Durham.—An old variety resembling Early Rose, but yield is small, although table qualities are good; it is not, however, worthy of general cultivation.

Early Peachblow (Foster's).—Very productive and excellent for table; has not been sufficiently tested yet to recommend generally.

English White.—An old variety, late; stalk large and spreading, tubers long and round, with deep eyes. It is not valuable for extended cultivation.

Early Snowflake.—Ripens about a week after Early Rose; uniformly symmetrical, medium size, skin white, with a russet tinge, flesh fine-grained; snow white when cooked; flavour fine, mealy, delicate; one of the best cookers; a fair even cropper, with even-sized tubers.

Eureka (Brownell's).—Has been tested fairly in several sections, and all concur in reporting it unworthy of extended cultivation.

Early King.—Stem strong and short; medium tuber, kidney shape, eyes shallow; flesh white; table qualities appear good, but is a poor cropper.

Fern Hill (Paxton's).—A new seedling resembling Burbank in shape; tubers medium to large, skin pink, eyes shallow; yields well and comes in early; mealy and good flavour; worthy of cultivation.

Fluke Kidney.—Late, productive, good keeper; will be fully tested and reported upon in two years or so.

Fox's Seedling.—Early, round, and said to be productive and very good; will be tested and reported next year.

Golden Russet.—Medium early, nearly round; eyes deep, waxy; not worthy of cultivation.

Grange.—A new seedling; stem short, leaves broad; tubers large and kidney-shaped, eyes deep; yields well, and very fine for table; good keeper, late, and likely to be a popular potato.

Garnet Chilli.—An old and well-known variety, but really not worthy of cultivation as there are so many sorts superior to it in yield and general qualities.

Hamlan.—A new seedling of 1879; stem about two and a half feet high; kidney-shaped, medium to large; flesh white; eyes few and shallow; fine flavour, very dry and very productive. It is worthy of a full and fair trial, as it promises well.

H. J. Hill.—A new seedling of 1879; stem stout and bushy, tuber oval; white and rough-skinned; medium size, keeps well, mealy, late. This is being tested.

Harrison.—An old variety, a seedling of 1860, from Cusco; kidney-shaped, white, smooth skin; grows large, yields medium, ripens ten days earlier than the Garnet Chilli.

Harlequin (or "Variegated Early Rose").—Was discovered several years ago in a field of Early Rose; it only differs from that variety in the *foliage*, which is described as variegated with different shades of white and yellow. But we find that the variegated qualities are a humbug, and the Harlequin should not be among the recognized varieties.

Hundred-fold.—Late; excellent for table; productive; resists disease. It is under test and will hereafter be reported upon.

Irish Lumpers.—Upright stem, tuber large, slightly oblong and flattened; colour whitish, waxy; bad flavour; might be valuable for cattle.

Irish Apple.—Stem strong and spreading, about two and a half feet high; tuber hollow at both ends, colour bright red about the eyes, the rest bright; mealy, good flavour and healthy. Highly recommended.

Jackson's White.—A northern variety; medium late; large, irregular, round to

longish; skin white and smooth, eyes deep; flesh white and finely grained; good table quality, good keeper; productive in some localities.

Irish Calico.—Upright stem about two and three-quarter feet, tuber round or slightly flattened; rough colour light brownish-red, with small portions of white near the stalk; mealy flavour, medium, healthy.

Improved Peachblow.—A cross between the Jersey Peachblow and Excelsior, it has some of the characteristics of both parents; the vines and leaves have the appearance of Excelsior, and the tubers resemble the other parent; quality is fully up to the old standard Peachblow; late, but earlier than the Jersey Peachblow, and productive.

J. H. Rowe.—A new seedling of 1880; upright stem about two and a half feet, tubers large, oval and rather flattened; very prolific; cooks well, mealy and fine flavour; promises to be a good table variety.

King of the Earlies, or *Bresee's No. 4*.—Very early; pink skin and white flesh; good for forcing, but so far it has proved a shy yielder.

Late Rose.—Was first offered in the fall of 1871; ripens two or three weeks after Early Rose; it has proved very productive, hardy, healthy, and an excellent keeper, retaining its good quality later than almost any other variety; it is entitled to be classed first class, and we readily recommend it for general cultivation; table quality is very good to best; flavour stronger and more decided than Early Rose.

Matchless.—Is from a seedling of the Early Rose, fertilized with the White Peachblow; tubers generally round, somewhat oblong, and occasionally flattened; very handsome and symmetrical in form; skin slightly russeted, pale red, except the eyes and seed end, where it is much brighter; flesh fine-grained, pure white, quality very good; cooks through evenly and quickly; a large cropper, keeps well, eyes slightly depressed, ripens with the Peerless. Altogether it should be placed among the best market sorts.

Mammoth Pearl.—Originated in Ohio; selected from over 2,500 seedlings; a very rapid and strong grower that the Colorado beetle could have very little effect upon; table qualities good, free from disease, handsome in appearance; skin white; flesh pure white—when cooked it looks like a ball of flour; eyes few, and even with the surface; oblong in shape. Ripens in August; productive to very productive; in many cases reported it has produced about double of many first-class varieties.

Perfection.—Stem medium height; tuber kidney-shaped; skin red; eyes few and shallow; size, medium; not likely ever to become popular.

Patterson's Victoria.—An English variety, considered one of the best in cultivation in that country; possessing good qualities for table, keeps well, and retains flavour. Has not been thoroughly tested yet in this country.

Pink Cups.—A new seedling; tuber resembles an Old Cup, but much larger; yields well, but table and general character not yet fully tested.

Pride of America.—A new hybrid from Vermont, closely resembling Snowflake in both appearance and quality, but ripens a few days later. It appears to be adapted to a great variety of soils, which cannot be said of the Snowflake; size large; very productive, with very few small tubers, all being a good, marketable size; keeps well, and so far shows no signs of disease; flesh very fine-grained and white; cooks well; dry and floury; considered to be without a fault as a table variety.

Purple Chilli.—Large broad stem; tuber, kidney-shaped; skin dark purple; eyes deep; medium to small, waxy; yield only medium.

Porter's Excelsior.—Pale straw colour; rough skin; flesh white; flavour fine; strong grower, and prolific under some circumstances only; tubers are inclined to be small, unless under favourable circumstances; flattish-round in shape. This is the earliest variety grown in Halifax.

Peerless.—Skin dull white, occasionally russeted; eyes shallow; flesh white and firm; grows to a large size; oblong; very productive, but not of first quality on heavy soil; it is placed among the best for general cultivation.

Ruby.—Stem short and stout, with broad foliage, thick, and a deep dark green; tubers oblong, and slightly flattened; colour red; eyes slightly sunken; flesh white, waxy, fine-grained, but inferior as a table potato.

Rennie.—A new seedling of 1880; stem stout and spreading; tubers elongated,

oval; skin bright pink; eyes full; flesh white, with pink circle a short distance from the skin; yields well; good keeper; promises well, but must be fully tested yet.

Rivers' Royal Ashleaf.—Not yet tested properly, but seems very early and of good quality.

Scotch Forty-fold.—A very prolific and fine quality variety in its native land, but not yet properly tested here to pass judgment upon it generally.

Sutton's Magnum Bonum.—A new English variety, considered there the best. The originator says of it: "It is now undoubtedly the most useful potato for general cultivation, combining great productiveness with excellent cooking qualities and late-keeping properties; it is invaluable both for the gentleman's and cottager's garden, as well as for field cultivation. The tubers are uniform in size, and of true kidney shape: the eyes few, very small, and almost level with the surface; skin russeted; flesh firm, and of excellent flavour; the vine is dark green, very robust in growth, which enables it to withstand disease better than ordinary kinds; it cooks well as soon as the tubers are large enough for the table, and it may be kept till most other varieties are useless." So far as tried it gives promise of being a good potato; we would not yet fully endorse the originator's statements. There are other varieties quite distinct from this, also called *Magnum Bonum*.

St. Lawrence.—Stem about two feet high, rather upright and full; tuber kidney-shaped, good size; colour red, and smooth; fair cropper; keeps well; medium late; would class about second-rate only.

Snowflake.—A sport of the Early Snowflake, and fully equal to that variety in quality and appearance; ripens three weeks later, and is productive.

Success.—A new variety, resembling Early Rose; yield fair; cooks well; ripens about same time as Early Rose. Not yet fully tested in Ontario.

Strawberry.—Stem short and stout; tuber medium, and uniform in size; shape nearly round, symmetrical; colour bright red; eyes few, and mostly at the seed end. This variety is grown mostly for exhibition, and cannot be looked upon as valuable generally.

Sutton's Red Skin Flourball.—Is valuable for its long-keeping quality; it is excellent, late in spring, when most other kinds are without flavour and worthless; it crops well, and resists disease; round in shape.

Schoolmaster.—Robust growth, large tubers, rough skin, delicious flavour, and good cropper; medium late.

Silver Skin.—A new variety—a cross of Early Rose and White Peachblow; resembles the Peerless in many respects, but is earlier and better in quality, and generally more reliable as a cropper; tubers medium to large; skin smooth and silvery white in light, clean soils; very few small tubers; slightly russeted; flesh very white, and grain fine; flavour good, mealy; free from disease; keeps well.

Trophy.—Tubers medium size, regular, elongated, oval, somewhat flattened; eyes few, almost flat upon the surface; skin reddish, slightly russeted; flesh fine grain and white; two weeks later than Early Rose. Upon the whole, however, when tested, the reports go to show that it is not likely to be valuable for general cultivation.

Washington.—A new variety; tubers long, and somewhat flat; eyes almost on the surface; colour of a rusty hue; flesh fine-grained; quality good; productive; strong vines, dark green; tubers closely clustered about the stalks; a few days later than Early Rose. Has only been tested one year in Ontario, and then under adverse circumstances; another year will test its value for this Province.

All the foregoing varieties have been tried, and are now grown, by Jonas H. Rowe, of King, in York County, who is a good authority upon potatoes. Mr. Rowe has adopted a new method of grafting, which, he says, is going to be very valuable, as he can bring in a new variety by thus crossing in one or two seasons, that by the system of seedlings, or pollen crossing, might take several years to prove. His method is a secret known only to himself, but his results have proved it valuable.

Allan's Hybrid.—One of the kidney varieties, a cross between Scotch Kidney and the old Pink Eye—it follows the kidney very closely; it is not a very large cropper, but fair; colour pure white; quality the best; mealy, hard to boil, as it cracks open easily. The peculiarity with it is that it succeeds best in dry seasons.

Ashleaf Kidney (Blue).—Rather delicate in growth, and a small cropper, with many small tubers; kidney-shaped.

Ashleaf Kidney (White).—Very similar to the blue variety, and not popular or likely to be.

N.V.V.—This is a new variety, being introduced in 1880; is fit for use very early; firm; cooks well; a red-skinned potato, rather deep eyes; promises to be a good variety, but not sufficiently tested to fully recommend.

White Peachblow.—A seedling of the old Peachblow; very late; large, irregular in shape; skin white and smooth, with bright pink eyes; flesh white; cooks very dry and mealy.

SWEET POTATOES.

Yellow Nansemond.—Is probably one of the best varieties for this Province; succeeds well, very prolific, and grows as large as six pounds in weight often.

Bermuda.—Is a fine-flavoured variety, but appears to require a longer season to reach perfection than the other; it is not so prolific, nor so sure a cropper.

Early Peabody.—A white potato, smaller in size than either of the above, and not so prolific, but of good quality.

There are several other varieties, but after testing, these three in the order given are considered as the best. The only difficulty to contend with is to get a long enough season to bring them to perfection—to get out the plants as early as possible, but not so early as to endanger them by frost. A good plan is to put down the tubers in an ordinary hot-bed, and when the sprouts are about three inches long, take up the tuber carefully, and with finger and thumb nip each sprout off close to the tuber; plant these sprouts out in the field or garden, and put down the tuber for another set of sprouts. Sweet potatoes succeed best in thoroughly well-tilled soil, deep cultivation, and under-drained, well-manured with rich compost; light soils are preferable; after well working it drill up well, and plant the plants about a foot to eighteen inches apart in the top of the drill; they want all the sun-heat they can get. The vines will spread rapidly, and soon cover every inch of the ground with a thick netting, but they should be cut back from time to time to throw as much nourishment as possible to the tubers, and hasten them to maturity; care should be taken, however, not to cut back the vines too severely, as thereby injury may be done by leaving too small a quantity of leaf or lung power to feed from the air the needed nourishment.

Peanuts.—Can be grown successfully in any of our warm, light, loamy soils, but do not think they have been tested sufficiently to judge whether or not the cultivation of them could be made profitable.

There are many other worthy varieties of potatoes, but those we have given, comprising most of the new potatoes, is a sufficient list, large enough for general culture. In the cultivation of potatoes there are, as in other crops, several points to be considered—the soil, the kind of manure required, the manner of planting, cultivation, etc. The soil acknowledged to be the best for potatoes is a rich loam, sandy, and neither too wet nor too cold; cool, moist soil will produce larger potatoes, but more liable to rot, and not so good a quality. In our opinion, a nice clover sod turned under is a good preparation for potatoes; if barn-yard manure is applied, it should be old and well-rotted at the time of planting; bone-dust, ashes, plaster, and such fertilizers can be used to advantage. A very common error is to plant too much seed, which, besides being a great waste, produces many small potatoes; two, or at most three, eyes in a hill, with a proper proportion of flesh to each eye, is sufficient—the tubers will be of more even size and a greater weight produced. Cultivation should be commenced as soon as the sprouts begin to break the ground; a good plan is to cover with the hoe as they are breaking through, thus smothering the weeds and leaving the hills clean; as soon as up, the cultivators should be started and kept going.

The main fertilizing ingredients with which the potato-grower must concern himself are nitrogen, phosphoric acid, and potash. Nitrogen being taken largely from the air, needs less effort to supply. To grow 100 bushels of potatoes without exhausting the soil would require an application of about eleven pounds of phosphoric acid, and thirty-four

pounds of potash. The most common source of supply of potash is obtained by the application of wood ashes, of phosphoric acid, pure fine bone-dust, bone-meal, and Peruvian guano.

DISEASE.

The most fatal disease of the potato crop is the rot, which is hard to account for; very hot, wet weather sometimes induces rot. The crop can frequently be saved by digging as soon as disease shows itself, even though the tubers are not fully ripe, and pitting up in the field, or in some dry place.

INSECTS.

The Colorado potato beetle is the most formidable insect to the potato crop yet known; can, however, be kept well in check by hand-picking the old bugs before they lay their eggs, which they deposit on the under side of the leaf. After the slugs appear, dusting with plaster in which Paris green is mixed is the best plan to kill them. Several machines for picking bugs have been invented, but, so far as we are aware, have proved of little use.

CHINESE YAM.

This valuable vegetable is but little known. The stem is of rapid growth and of creeping habits; is valued very much as a flowering vine, having many small white flowers, growing in clusters. The tubers are something like sweet potatoes, of a pale russet colour, oblong, and larger at one end; they are valuable for food, the flesh being very white, having a rich taste; may either be boiled or roasted. The tubers remain in the ground over winter, and continue to grow the next season; will grow to the length of two feet or more the second season, and if left to grow, will in four years attain very large size. They increase from small tubers that grow on the vine above each leaf; these should be saved in the fall, and kept where they will not freeze. The cultivation of the yam is worth a trial.

Of other vegetables we might go into an extended description of each kind, and the manner of cultivation, but this will probably be unnecessary; we will therefore refer to some of the most prominent, giving varieties which, through experience, have been found best for cultivation in this Province.

LIST OF VEGETABLES.

Asparagus.

Conover's Colossal.

Beets.

Pine Apple (Henderson's).
Egyptian Blood.
Blood Turnip.
Long Blood.

Beans.

Dwarf Wax.
White Wax.

Cabbages.

Henderson's Early Summer.
Jersey Wakefield.
Winningstadt.
Flat Dutch.
Marblehead.
Red Dutch, for pickling.
Drumhead Savoy.

Carrots.

Scarlet Intermediate, for table.
Early English Horn.
White Belgian, field culture.
Long Orange.

Cauliflowers.

Lenormand's.
Early London.
Dwarf Erfurt.
Extra Early Paris.

Celery.

Henderson's Dwarf White.
Sandringham Dwarf White.
Boston Market.

Corn.

Crosby's Early.
Stowell's Evergreen.
Mammoth Sweet.

Cucumbers.

Early White Spine.
Improved Long Green.
Early Green Cluster.

Lettuce.

Early Curled.
White Cabbage.

Melons.

Green Nutmeg.
Skillman's Fine Netted.
Mountain Sweet.
Black Spanish.
Long Island.
Phinney's Early.

Onions.

Wethersfield Red.
Danvers Yellow.
White Silver Skin.

Parsnips.

Hollow Crown.

Pumpkins.

Large Field.
Mammoth.

Radishes.

Early Scarlet.
Long Scarlet.
Black Spanish (Winter).
White Russian.

Squash.

Hubbard.
Early Bush Crookneck.
Vegetable Marrow.

Tomatoes.

Dempsey.
General Grant.
Trophy.
Acme.

Turnips.

Nimble Dick.
Early White Stone.

The root crops—carrots, turnips, mangold-wurzels, beets, etc.—have become of great importance in Ontario, and in stock-raising districts are almost considered a basis of successful farming. With good roots, fed in warm stables, cattle can be wintered cheaply, and come out in the spring in a thrifty condition. The sugar beet ranks high as food for cattle; in fact, we believe it is coming into more general favour each year. In the old country the mangold-wurzel is taking the place of turnips, from the fact that it is not subject to the ravages of the turnip fly—an insect that frequently destroys the turnip crop there, and is becoming a formidable enemy here. We are confident in saying that were more roots raised and fed, land would be kept cleaner and in better tilth, besides the roots being healthful for stock during the season of dry feed. Vegetables of all kinds are also looked upon as wholesome food for the human family; and while in this Report we have attempted to give some general ideas upon the culture and value of our vegetable productions, we hope the study of this subject may be further continued by other Committees, to report at future meetings of this Association.

W. PEMBERTON PAGE,
Chairman of Committee.
P. C. DEMPSEY.

MR. BUCKE.—I have great pleasure in moving that the thanks of the meeting be tendered to Mr. Page for his very able paper on Vegetables. He says that Paris green should be mixed with plaster. I have always found water better to mix it with, for the simple reason that if you put it with plaster or anything that blows about, the party putting it on is apt to inhale it. I think if you put on a teaspoonful to a pail of water, and sprinkle it on with a few twigs, it can be done safely. Paris green is a cumulative poison; it remains in the system; and if you only breathe a little now, a little to-morrow, and so on, you may at last have enough in the system to either destroy life or materially injure the constitution. Therefore I think great care should be taken with Paris green. It is a very insidious thing; it might injure people almost without their knowing it. I would be very much obliged to Mr. Page if he could tell us where the yam is to be had. I think several of us would like to try it, and if it is a success it might be sent out by the

Association. I do not think the sweet potato has been a success in Canada; the season is not long enough for it. I move that the paper be received, adopted, and printed.

MR. A. M. SMITH seconded the motion.

MR. PAGE.—I shall reply first to Mr. Bucke's remarks on the plaster and Paris green. I believe there is a great deal of caution necessary in applying Paris green to potatoes; but his plan of applying it with water would be a pretty slow process if you had three or four acres of potatoes to go over, and water to draw—as many would have to do—over two or three fields. If used carefully in plaster, the Paris green not only kills the bugs, but the plaster with the green seems to have a beneficial effect upon the tops of the potatoes. I have noticed, after putting this mixture on the potatoes, that they would assume a very green colour, look rank and healthy, and grow well. With regard to the Chinese yam, I raised some myself last season. I procured the tubers from Bliss & Son, of New York, of whom I presume any amount of tubers can be got. I obtained some small tubers, not over an inch in length, and the vines grew from those tubers ten or twelve feet in length in the one year. The vines look something like those of a sweet potato. I trained them up on a trellis, and they made a very nice vine. They did not flower with me last season; I presume they will flower the second season. It was the first time I ever raised a yam, and it was an experiment with me.

MR. ARNOLD.—I used to use Paris green with plaster of Paris, but I came to the conclusion that the bugs were not foolish enough to eat plaster of Paris if they could get out of it. I have since used flour, but at length have adopted Mr. Bucke's plan, and when you have not to carry the water too far it is the best one. It is over thirty years since I planted the Chinese yam, and I have not been able to get rid of it since, although I have tried several ways. It is perfectly useless. It has been rejected by every man who has tried it.

MR. SAUNDERS.—I have had Paris green tried on large patches of potatoes, and I have found by experience that there is less trouble in applying it with water than in applying it the other way. It is much easier to apply it with water, and, besides that, much more economical—you use less of the Paris green. The method I have adopted is to have a man carry a pail full, or three-quarters full, of water in one hand, and a corn broom whisk in the other, and in that way he can sprinkle it about as fast as he can comfortably walk among the vines. As to the plaster being beneficial to the potato, that is no doubt correct; but it might be applied separately from the Paris green altogether.

MR. CROIL.—I can endorse the opinion that with the water is the best way to apply the Paris green. I use a common watering can, with a very small rose, and I find it does it a great deal better, more quickly and neatly, than a whisk. Some say that Paris green hurts the stems. I am inclined to think it does if it is put on too strong; and it is often put on too strong. A teaspoonful in the pail is quite sufficient; but the common thing is to put in a tablespoonful.

MR. BEALL.—I have tried both plans, and I like the whisk altogether the best, because we can throw it underneath the vines with the whisk where we could not throw it with the sprinkler. I like the plan of using water much better than using plaster. I find that when the first application is made there are any number of eggs on the under side of the leaf. These cannot be got at just then; but by applying with water the Paris green sticks to the leaf for a few days, and these youngsters, when they come out, naturally want something to eat, and they devour the Paris green.

MR. SAUNDERS.—I have been experimenting with London purple this last year, and I find it is a substance very variable in its composition. It is a waste product obtained in the manufacture of aniline dyes. There is a considerable amount of arsenic used in the manufacture of these dyes, and it remains in the waste product, which was formerly carried out into the ocean and dumped there. Sometimes it contains eighteen or twenty per cent. of arsenic—sometimes over forty. The consequence is, you never know, unless you get it analyzed, what strength you are using. It is a little cheaper than Paris green, but it is not any cheaper than to make a mixture of arsenic and lime yourself, and it consists chiefly of arsenic and lime with a little colouring matter. I do not think it is likely to be, in the hands of the public, either as efficacious or as safe a remedy as the Paris green.

MR. JARVIS.—I have tested the Chinese yam in its native country, and I must say I have never had much fancy for it, even where it grows. I have on one or two occasions, though, stewed it up with Java chickens, and we used to pick out the chicken legs and leave the yam. At any rate, it would only be an amateur's experiment trying it in this country. With regard to the sweet potato, I spent a great deal of time the summer before last in trying to cultivate it, and I must say that, with the exception of showing people that I was growing sweet potatoes, the attempt to grow them here was not a success at all. It is just throwing away one's time, unless he wishes to have these things as an amateur. If you wish to have a sweet potato, it is very easy to have it in this cold country by putting a good Early Rose outdoors, letting it freeze, and then bringing it back and cooking it. With regard to Paris green being mixed with plaster, I have never used anything else, because I have found that thoroughly successful. Some have used ashes and some flour. I do not think we ought to feed our good flour to potato bugs. It is just as people take the fancy whether they should use the Paris green mixed with water or use it mixed with plaster of Paris; either way is sufficiently successful. For the long number of years that we have now been troubled with the Colorado beetle, we have seen nothing to equal the Paris green, used one way or the other; but I really think that when the potatoes are first growing, the sprinkling of them with plaster of Paris does a great deal of good. If I were to use the water for greater safety I would first go over the patch with it, and afterwards with the plaster of Paris, for the sake of having the benefit of it. With regard to peanuts, I think they are a sort of amateur production like our Chinese yam and sweet potato.

MR. BUCKE.—I should like to have an expression of opinion now, as to whether the Colorado beetles are getting fewer or not. I think round about Ottawa they are.

MR. JARVIS.—Last year, when digging in the gardens, we did not see one old bug, and we thought we had got rid of them entirely; but they came on in great force during the year. Where they were not attended to—in some parts of my plot where we did not use the Paris green at all—they appeared to cut off the leaves, but the potatoes did not seem to be much injured by them. I think generally they are not doing the same injury to the potatoes that they did some years ago. Last year especially they were not so numerous through our section of the country, nor did they do so much damage.

MR. SAUNDERS.—I believe the bug was not nearly as common last year, which is to be partly attributed to the large use of Paris green, and to the fact that the insect enemies of the bug have increased very materially and prevented its multiplication. There are now about half a dozen of these insect enemies of the Colorado beetle, which feed on it. Then, the bug is subject to the vicissitudes of climate; and there are some seasons which are more favourable to the production of insect life. Last year seemed to be an unfavourable year in that way. I think the lessening of the numbers of the Colorado beetle is to be accounted for in these three different ways. I am in hopes that we shall not have again the trouble that we had on their first appearance—whole fields destroyed, and stalks eaten bare to the ground. This intelligent way of treating them when they appear in numbers, and the increase of these insect enemies, help us to keep them within bounds.

MR. ORR.—At first I was very careful to pick off all the bugs, and afterwards apply the Paris green with water. Last year we did nothing at all, and we had quite as good a crop as any other year.

MR. DRURIE.—In my township quite a number of farmers grew from ten to fifteen acres of potatoes last year. They paid no attention to the insects at all, and they harvested excellent crops. Our opinion is that the bug is about played out, and that something is going to rid the country of them.

MR. SMITH (Glenfield).—We have always fought them. Sometimes we have used the Paris green with flour or buckwheat meal, and sometimes with plaster of Paris. Either of these is a good way of destroying them. We have gone through and whipped them off the bush into a dish and killed them. There were plenty of bugs with us last year, and if we had not fought them I think we should have had as many of them as any other season.

MR. PAGE.—I am pleased to hear the discussion this paper has brought out. Refer-

ring to the peanut, I do not myself think it would be of practical benefit to pay much attention to the growth of it. As for the yam, I believe it is worth growing for the sake of the beauty of the vine; it makes a very pretty vine. As to the flavour of the fruit, I think if the taste of the gentleman on the other side of the house (Mr. Jarvis), in respect to the yam, is similar to his taste with regard to the sweet potato, I cannot put much reliance on his judgment in the matter of taste. I have always been for some years back in the habit of taking a good deal of interest in the trying of these things when they come along; and I have grown the yam for one year, and hope to be successful in growing it for another year, and to be able to report here with regard to it. I see this Report has been adopted by the Association. Since its adoption a number of persons have spoken who do not agree with it in regard to Paris green. Would it not be better to change the Report in that respect before it is printed? Otherwise it might mislead the people.

MR. BEADLE.—Our custom is to print the Reports as they are received and read. The discussion on them is printed also; and the public can judge for themselves.

MR. WOODWARD.—This discussion with regard to the Chinese yam makes me think of one point in reference to it. It is just like a Chinaman in his always expecting to go home. But there is this difference in the yam: it always starts to go home from whatever place you plant it in; and it takes a pretty smart boy to keep up with it. This is not a congenial climate for the potato beetle; he revels in a climate where it scarcely ever rains. Our climate occasionally destroys him, as do also insect enemies. This last year in western New York we had very little trouble with the potato beetle. I think the majority of our farmers did not apply any remedy at all; and the potato crop was very good. We have had years like that before. There have been years when scarcely a pound of Paris green has been used in the whole county; and the next year tons of it have been used. I think the only way is to watch the beetles carefully. Our large potato growers now uniformly apply the Paris green in powder. With a large patch of potatoes it is too expensive to apply it with water. We apply it with plaster of Paris and flour mixed; and if I was going to use water I would put a little flour in the water. I have applied it myself in water; and after waiting a few days I have found that that did not answer. I have then applied plaster of Paris and flour, and after again waiting a few days there was not a beetle to be found in the patch. We apply the Paris green in a powder containing some flour. You will see men out dusting the powder on the plants from as early as they can see in the morning until the dew goes off; and then they will do it again in the evening after the dew has fallen; they try to apply it when it is damp, and then the powder adheres to the plant, and the insects eat it.

CHIEF JOHNSTON.—I agree with several who have spoken on the subject of the potato beetle, that there is not the slightest doubt that we have to fight him just as the American Government fought with Sitting Bull, and when they drove him within the British lines we had to fight him there until we got him quiet. I have noticed that the potato beetles which attack one crop will go into the ground, until you plant the next, and then they set to work again. I had a patch of potatoes a year ago last summer; and I fought the bugs then with Paris green to very little effect. A neighbour of mine, an old Indian, said "Now, Mr. George, why don't you take a load of hot lime and coat the field all over with it? That would destroy those beetles that you have been Paris green-ing all summer." I did so last year without using any Paris green, and I never had better potatoes in my life. I believe the lime kills the beetles in the ground; and besides that it is beneficial to the soil. I cannot vouch for the efficiency of this plan; that was only my first trial; you hear the result of it, and you may judge for yourselves.

ROSES.

BEST TWENTY-FOUR VARIETIES OF HARDY ROSES, INCLUDING CLIMBING, HYBRID PERPETUAL, SUMMER AND MOSS ROSES.

MR. BEALL.—Since I have been at this meeting I have got the impression that many persons here think that nothing of this sort can be grown at Lindsay. I have heard the

remark made that the best advertisement Canada ever got was when she exhibited fruit at the Centennial, because it showed people who may have been inclined to doubt the fact, that she was civilized. Well, I think if I can show you that we can successfully grow fine roses at Lindsay, I can show you that we are not altogether beyond the bounds of civilization. I have merely prepared a list of those that I think will succeed in our county, with a few remarks respecting each. In the first place, I have only tried one Prairie rose, and that is the Queen of the Prairies. I cannot imagine that any rose can satisfy the grower much better than it. Last summer, and several summers before, I could, I have no doubt, have gathered a thousand roses any day during the season from the one plant. Among summer roses I regard the Madame Plantier as being the best of all the white roses, and it is perfectly hardy; even last year when we had no snow, and yet one of the hardest winters we ever had, there was not a twig of it injured, although it had no covering. The Coupe de Hebe I never knew the name of till last year, when I took some samples to Guelph and found it was the old Cabbage Rose. It is a very satisfactory rose to grow. It is one of the sweetest, and perfectly hardy. We also grow the summer rose, Persian Yellow. I think it would almost grow at the North Pole. The common Moss Rose is so well known that I think it requires no description. Of course, I speak of the rose that is known as the old Common Moss. It has two faults: the first is, that the foliage is the worst, perhaps, that any of our roses there have; it is very bad indeed. That is, I think, a great objection to a rose. In the second place, it suckers very much—so much so as to become almost a nuisance. The Countess de Murinais is a beautiful rose—beautiful in bud, beautiful when open, but most beautiful when half open. I think the great beauty of all moss roses is in the bud when it is about a third open. But unless a person is a very early riser, he will not see the Countess de Murinais in its best stage. A few minutes of sunshine will cause the bud to burst open. We also grow the Madame Alboni. It is a rose of great merit. Its bud is not so good as that of the common moss, but when half open or fully open it is perhaps more beautiful than any other of the mosses; and in this stage its perfume is most exquisite. In form and colour it is perfect. In colour it is a light pink shaded deeper in the centre. To have this rose in perfection it should be well shaded and protected from strong winds. Not that I think any rose can be grown in the shade; but if it begins to bloom, the bloom requires to be shaded. The foliage of the Madame Alboni is the best without any exception of any rose we have, and it has always been the same with us every year. Of the autumn roses we have the Alfred Colomb. It is very red, fine form, and very showy. The next is the Duke of Edinburgh. This is described in Mr. Beadle's catalogue as "brilliant scarlet crimson shaded with maroon, large and full, extra fine." That seems a glowing description of a rose; and I may say that I was somewhat disappointed in it, because it was better than described. The colour is certainly most wonderful. We grow the General Washington. The colour of this rose is very good; but it is only half double with me. The Marie de Ducher is a very good one. Its colour is purple, with some crimson and scarlet. The Jules Margotten is a deep red rose, very fine and fragrant. It should be better known, as it is very hardy and continues to bloom during a longer period than any other with one exception. The Lena Turner is a bright cerise. It has beautiful large, full, imbricated flowers. It is one of the first to bloom in the spring, and continues to bloom throughout the summer with few and short intermissions. It is always the "last rose of summer" with us. A cluster of four, about half open, was gathered on the 14th of November, last fall, during the first snow storm. The Madame la Baronne de Rothschild is a magnificent rose, and well deserves a place in every garden. It is a clear, pale rose, shaded with white. The Xavier Olibo we also grow. Its colour is a velvety black. The rose advertised so much by the Americans lately as La France, is very fine, but with me it is not sufficiently hardy. It is the only one with us that was entirely killed last winter. That was the only winter that we ever allowed our roses to pass through without covering them to some extent, and I believe it was the hardest winter that we have had since I have been on the place where I am now living. La France died entirely.

MR. WELLINGTON.—La France would not succeed, I think, without protection; but it is certainly one of the finest, if not the finest, hybrid perpetual roses that have been brought out. It is a free bloomer, its perfume is delicate and exquisite, and with protec-

tion I think that even Mr. Beall would find it would be a success. There is also the *Coquette des Alps*, another of the new French varieties, which is a profuse bloomer. With good treatment it will bloom all the season until cut off by the frost. *Coquette de Blanche* is another of the new varieties, and *Louis van Houtte* and *Victor Verdier* are also new. Coming to the Tea roses, I have found the *Duchess of Edinburgh* one of the finest. It is a little hard to propagate, and a slow grower. Among the Moss roses I should be inclined to put the "*Crested Moss*" at the head of the list; and *Madame Alboni*, I consider as good probably as Mr. Beall. I judge that the suckering is caused by the Moss rose being usually budded or grafted. *General Washington* and *General Jacqueminot* among the old sorts, I think are good. There is a general impression that the most of Canada is not adapted to the growth of roses; but I think want of success is mainly owing to not giving them proper attention. I lived two years in the State of Maine, in Augusta, the climate of which is more rigorous perhaps than that of Lindsay; and when I went there they told me I could not grow roses. I am fond of roses, however, and I was bound to have them. I planted out three dozen, and before planting them I dug fully two feet deep, filled the trench three to four inches deep with well-rotted compost, and then put in the best of surface soil well mingled with well-rotted manure; and that season I had as fine roses, I believe, as were ever grown. I had them from June until the frost came. As soon as my plants got through their first series of flowering I cut them back, and I had from two to three series of flowers during the season—in fact, they were in constant bloom, and they passed through the winter successfully with slight exception. I find that generally roses are half starved at first. Any flower that is perpetual must be well and liberally fed, must have a rich deep soil, and if you have it not, you must make it. Let them have this and good winter protection, and I can grow roses in Canada.

MR. BEADLE.—The rose is my favourite flower. I have given it a good deal of care. There are some difficulties that we have here in America generally, that we have to contend against, and in some degree submit to, which makes it impossible for us to grow quite as fine specimens of that flower, and keep them quite as long as they can in England in that cool, moist, and somewhat overshadowed climate. Where there is a good deal of cloudy weather the roses do not burn as they do with us, particularly the dark-coloured varieties. I have noticed that some days if you go out early in the morning before the sun is up, and get among the roses, they are just a splendid sight; you wish they would last all day. But as the day comes on the sun seems to burn them up; the dark petals absorb all the rays of heat, and those roses that were so beautiful in the morning, you can take at night and crumble up like dry leaves. That may in some measure be guarded against by shading the red roses. I have known some gentlemen go so far as to stretch a little canvas during the mid-day to shade their rose beds. Those who have the time to do all this can do it and enjoy their roses in that way. We get along with the lighter colours better; and we can enjoy those roses without getting up quite so early in the morning. If people want to enjoy their roses in the evening they will have to be contented with the less highly-coloured varieties, such as the *Beauty of Waltham*, *Coquette des Alps*, and *Coquette de Blanches*. These two are Hybrid Noisettes. We are on the eve, I see, of having a new strain. We shall now probably get a class of roses a little tender, but which will bloom all the season long; if they are carefully attended to and well fed they will bloom till the frost comes; and some of them are exceedingly beautiful in their colouring. *La France* is a beautiful rose. It may be that it is a little delicate; I think probably it is, and that it will want protection. The *Beauty of Waltham* I have not found to need protection in our climate. Nor have I found the *Baronne Prevost* to require it; it is a rose that flowers freely a second time. The rose list is too long to go over it with any degree of minuteness; and I think that what we need to study is to select as fast as we can those varieties that do best in our climate. Still, there will be all the time these new roses coming out. Our rose growers, both in Europe and America, are not going to be satisfied with the old varieties, but will try to get new ones; and we will just have to try which are the best for our climate. I think there are very few gentlemen's grounds in Canada which contain a well-assorted lot of good roses; and when I go to some of our summer flower exhibitions the roses are not up to my idea of what they should be. I hope the little discussion we are having here to-day will help to turn more attention to a flower that to my eye is the most beautiful thing we have, taking it all in all.

MR. BUCKE.—I have often heard our premier hybridist, Mr. Arnold, say that if he had his life to live over again he would go into crossing all the varieties of flowers with our native kinds, and that he has no doubt it would be a valuable thing—that he would get up some very fine flowers. I think this could be very well done with our native Dog Rose, which grows along the hedgerows in the oak plains. I think we might get a hardier strain of roses in the same way that we have got a hardier strain of grapes, by beginning at the initial act of hybridizing with our native roses. I think, however, that it would be some years before any good result came from it.

THE PRESIDENT.—The rose is my favourite flower. The finest varieties are too tender for our climate. I remember a few years ago reading of an election that was taken in England upon roses, and there was one gentleman who said that if they wanted all the rest of the roses, they were welcome to them, provided they would give him the Gloire de Dijon. It is a tea rose, and a favourite with me. In his description of it this gentleman, who was somewhat comic apparently, and who called the rose “the Gloire de my John,” said it accommodated his nose as well as his eyes. Now, I do admire the perfume of a tea rose. The Hybrid Noisettes, the new roses that are coming out now, I have tried a few of, and I find I can grow them just as easily as I can a Cabbage Rose, though they are a little tender. The Cabbage Rose gives little satisfaction unless we give it a little attention; but it richly pays for cultivation. The greater part of my life I have been trying to grow roses and failing; but I got a few ideas from a work published by a Mr. Hole, a Scotchman, on Rose Culture, and followed his directions as well as I possibly could; and I have had no difficulty in growing fine roses ever since. Having read his work, so suspicious was I that I was going to fail again after a great many efforts that I planted a block of roses at the back of my house where they would be out of sight, because I began to think people had laughed at me long enough for fooling away so much money. I selected a little spot at my back kitchen door; I prepared the land thoroughly by digging deep, manuring deep, and using strong cow manure—I found it better than horse droppings. After making this preparation I planted the best varieties of my Hybrid Perpetuals and Hybrid Noisettes that I could get. We just carefully prune them twice a year, and in winter we cover them with a little earth. Then I throw some marsh grass over them. I manure and mulch the soil every fall very carefully. Mr. Hole says we will not be bothered with insects so long as we maintain a vigorous growth. I find this to be a fact; if you can so cultivate your roses, and so prune them as to maintain a vigorous growth, very few insects will be seen on them—at all events, I have never been bothered with them since I have adopted this plan. I have never been bothered with the rose thrip much; I have some, but they disappear of themselves.

MR. BEALL.—You just now said that in this country the Cabbage Rose is usually of small size.

THE PRESIDENT.—No, that it is much larger and finer if protected; it pays for protecting. The manner in which I used to try to grow roses was to make a nice little hole in the ground in front of my house and sod all round it. I would give the rose a space about the size of a bushel basket. I would plant it in there, and the grass would absorb all the moisture, and all the fertilizing properties apparently, and really my roses were starved. Now I give them the whole ground—make a bed of roses.

MR. HOLTON.—There is one rose that I think is well worthy of cultivation as a climber in this neighbourhood; I refer to the Baltimore Belle. There is a great variety of roses, and all of them have some merit or other; but I do not know whether it is worth while to multiply names or not.

MR. BEALL.—I had intended to ask if the Baltimore Belle was really as good as represented. I bought two Baltimore Belles at different times, and planted them; but they have always turned out to be exactly the same as the Queen of the Prairies. I intend to try again.

MR. ARNOLD.—When I talk about roses, I feel vexed with the Secretary, myself and everybody else. We ought to have a Canada Rose. We have had a stock to work upon. We talk about hardy roses. For my part, I cannot think of half a dozen hardy roses—that is, roses that will stand the winter. When I go through our native woods sometimes and see a bed of wild roses, and see them standing the winter—as they

sometimes do at 30 degrees below zero—I am vexed that the Secretary or I have not tried to graft roses with these. Of my six hardy roses—I can only think of six—there is one old one called *Blanche Vidot*, that grows six feet high, and it is perfectly hardy; you can make walking canes out of it after it has stood there five or six years; it will grow in almost any kind of soil. Then there is the common Moss Rose. Mr. Beall speaks about it throwing up such an abundance of suckers; with me it does not. For colour I take the *Luxembourg Moss*, a very dark rose. There is also the *White Perpetual Moss*, which we all know is nothing like perfection. It bears sometimes two or three different kinds of roses at the same time. The only Hybrid Perpetual Rose that I have which could be called perpetual is the *William Jessie*; it is an old rose. I do not consider that for Canada there is much improvement in roses. We are getting roses from foreign countries which are not at all suited to us. I do not know anything equal to the old *Cabbage Rose* for fragrance; and what is a rose without fragrance? That beautiful *Queen of the Prairie*, when we go to it and find it has no fragrance, we feel like turning it out. There is no manure that I know of equal to burnt sods. It gives, in my opinion, far richer colour to many roses; and it certainly gives health and vigour.

MR. SAUNDERS.—As to the difficulty of controlling some of the insect pests, every year I have a number of ladies coming to me to know what to do with their roses; there is a worm in each bud eating the inside out of it. Paris green, applied mixed with water as for the potato bug, is an efficient remedy for that little worm. Until we adopted that, we could not control that pest at all; now, by giving the plants a little showering with water and Paris green before we expect the worm, the worm is killed, and we have no trouble with it. Another pest is the rose slug. The same remedy will control that effectually. Hellebore does the slug very well; but it does not seem to affect this little worm in the bud.

MR. WOODWARD.—I am not very much of a rose grower, although my girls have roses all about, and know a great deal more about them than I do; and I notice they make a great demand in the spring for very rich soil to put round the rose bushes. I do not know what they use for the pests, except that they apply whale oil soap a good deal for the thrip, and I know they grow some very fine roses.

NUT-BEARING NATIVE TREES.

MR. BUCKE read a paper on the subject of Nut-bearing Native Trees, as follows:—

“Can any of our native nut-bearing trees be profitably cultivated, either for nuts or timber, and where is the northern limit of each?”

The above question has been put into the hands of every member of the Fruit Growers' Association, and I trust it will meet with a response not only from those who are assembled here to-day, but from others also who take an interest in forest tree culture—a subject which is awakening a deep interest, not only in Ontario, but in all parts of the Dominion, where the denudation of both the public and private domain is being carried on to an alarming extent. But deeply as we are interested, who once had, and are losing our forests, still more will those be exercised over this question who have, are, and will be settling in our north-western plains, where, from the sweeping forest fires and other causes, forests such as we have “loved and lost” have had no existence “in the memory of the oldest inhabitant.”

Although the above question only calls for remarks on nut-bearing trees, others have a proportionate value, and any remarks with regard to the cultivation of these will apply equally to the seed and cone-producing varieties as well.

The butternut has the most northern limit, which is found to begin at the southern end of Nova Scotia; running north it passes about midway through New Brunswick, crossing the St. Lawrence river at Quebec and extending some thirty miles to the north of the city of Ottawa, and from thence strikes the southern end of the Georgian Bay. This tree is the hardiest of our nut-bearing species, and the area of its growth is quite extensive, and for all practical purposes it could, by replanting, be maintained for all time

to come. Every autumn the nuts are sold by the two-bushel bag on the Ottawa market, but I am unable to quote the price, never having purchased any. The timber of this tree loses the name of butternut when it is cut into boards and scantling, and assumes that of grey walnut. The expert cabinet-maker, by a certain staining process, is enabled, after the wood is worked up, to make it so resemble black walnut that it requires a practical eye to tell the difference.

With regard to the cultivation of this tree, I speak from practical experience when I state it is one of the very easiest grown I know of. If given anything like a square chance, it will produce nuts after ten years' planting, and I believe a good saleable tree may be had of 18 inches through, at from twenty-five to thirty years from the nut.

The seeds are not in great demand at present, though I feel sure if they were advertised like other commercial products a market for them could be created, both for home, the North-west and European planting, and I make no doubt the United States alone would absorb a large quantity, if nurserymen, private individuals and farmers knew where they could be procured.

Besides the value of this tree for timber and nuts, the feathery palm-like spread of its graceful leaves and clean-looking stem makes it a great object of beauty on the lawn, and for a wayside tree or a pasture shelter there is nothing gives a much denser shade, though probably if planted along our roadsides the ubiquitous boy might injure it whilst robbing the trees of their autumn nuts. Those gathered early in the season make a pickle fully equal to the walnuts of English manufacture for which Cross & Blackwell are so widely celebrated. This tree has another advantage for wayside and hedge row planting—it never suckers. The bark is also used by farmers' wives for imparting a rich brown to their home-spun yarn, before it is manufactured into stockings or woven into fabrics.

Black Walnut (Juglans Nigra).—This tree closely resembles the former in shape, and the general appearance of its leaves—so much so, that people accustomed to see them side by side are scarcely able to distinguish them, but by running some leaves through the hand the black walnut gives off a strong scent, whilst the butternut is odourless; the nut of the former is more spherical than the latter, and does not contain so much kernel as the former. This fact, however, does not detract from it as a suitable nut for a pickle. It is scarcely necessary to state that the wood is much more valuable, and that its crotches and roots are greatly sought after for cabinet work, gun stocks, etc., and all purposes for which it is required; it brings a high price in the market.

This tree is only indigenous to a small area, extending from a point near Port Franks, on Lake Huron, running north of London nearly in a line with the Grand Trunk Railway to Toronto, and extending along the lake shore as far east as Cobourg. I am satisfied, however, these limits could be considerably extended, but even the area mentioned would give a good many thousand acres of waste lands and side roads for planting, should no one feel disposed to trespass on the best part of his farm for the cultivation of this most valuable of all Canadian trees.

Sweet Chestnut.—This tall and handsome tree, the leaf of which much resembles the beech, but is more glossy and attractive, has a still more southerly range. The northern line of growth crosses the Detroit river a little above Windsor, cutting across the Peninsula to Long Point. Taking a northerly direction from this point on Lake Erie, before Port Stanley is reached, the line strikes near St. Thomas, running north of Hamilton and Toronto, curves about forty miles north of Lake Ontario and runs into that lake a little further east than Port Hope.

The nut produced by this tree, though frequently sold in stores, has not a very high commercial value, as it is smaller than those cultivated in Europe. It, however, serves to indicate in the same way our wild grapes do, that the better varieties might be easily grown. Its wood is chiefly used for furniture in ladies' boudoirs and bed-rooms, as it gives a bright and airy appearance to a room. Its grain is wide and open, and when oiled and varnished has a pretty light yellow colour.

Hickory (Carya Alba).—The northern habitat of this tree is probably on a line with the butternut. The shell bark variety finds its chief home in the woods of the County of Lambton and West Middlesex. The tree is not easily cultivated, as it is a slow grower

and difficult of transplantation, but its wood is so valuable where toughness and elasticity are required that it commands a high price. It is principally used for tool handles, carriage spokes and fellies, and if grown in sufficient quantities would readily find a foreign market at remunerative prices. This tree is usually cut in its juvenile stages, when from four to six inches through at the butt, and consequently could be more advantageously grown in plantations between trees used at a more mature age, which would be relieved by removing the hickories as required. If grown as proposed, the nuts could be dropped where it was intended the tree should stand. The foliage of the hickory is of a light pleasant green; the rich leaf would add much to the beauty of the home surroundings. The nut deprived of its shell may be obtained from all itinerant newsboys on boats or cars, as no doubt my hearers can willingly testify.

I would strongly urge upon our farmers and others, especially those in youth and middle age, to begin at once, if they have not already done so, and prepare a suitable piece of ground, well fenced with some durable material, such as cedar posts and barbed wire, and obtain and plant some of the nut-bearing specimens I have spoken of. Any soil suitable for corn or wheat, having previously had a hoeing crop, such as potatoes or mangolds, would suit admirably for the purpose. A half acre well ploughed and planted with nuts would raise enough young trees to cover several hundred acres, or if used for roadside planting would extend a number of miles. The cost of seed, care and culture would scarcely be felt, while the beauty insured would be a lasting one, and would hand down the name of the patriotic individual who went into the business for many generations. Seeing trees grow is a thing that all lovers of nature take pride in, but to grow them oneself is a pleasure indeed. Before the white man invaded this continent all the nuts alluded to were used by the North American Indians as an article of diet, and ancient records testify that the quantity consumed at one meal was incredible, and certainly would be unsafe for more civilized stomachs.

I have omitted to mention the acorn or *quercus* family, of which there are five varieties, as I do not suppose they come within the meaning of the term "nut-bearing" trees.

I cannot close this paper without a further strong recommendation to all those who have not given this matter the attention it deserves, to begin at once to plant, and to plant early and plant often, and especially to commence with the nut-bearing trees. The collection of their seed is easily made—much more so than that of the smaller seeds. My friend Chief Johnston can supply any amount of either black walnuts or butternuts, and they will be found the handiest and easiest to plant. It would be well, also, to secure at some of the shops at once, before they become too dry, some sweet chestnuts, and pack them in moist sand, keeping them in a cool cellar until spring, when they should be planted early in a deep rich bed, about an inch and a half deep. I will conclude this paper with a few lines written for the occasion:—

No man who owns a house or hearth,
A rood of land, a speck of earth,
Can say his duty he hath done,
If when the eve of life hath come,
He cannot point to some cool shade
By tree, himself hath planted, made.
Its youth his youth in union sprung,
In middle age its praise he sung,
And ere his mortal coil shall dwell
In tenement of coffin shell,
Beneath its shade a spot he'll choose,
Where autumn skies and autumn hues,
Shall blend in harmony on high;
And from a noble canopy,
His only epitaph shall be
The waving sigh of that dear tree.

MR. DRURIE.—I see Mr. Bucke states in his paper that the butternut will grow thirty miles north of Ottawa, and that the hickory grows in the same section of country. I would like to ask him if he has ever seen any hickory growing there? I have travelled all through that section of country, and I have never seen hickory growing anywhere north of about thirty-five miles north of Toronto.

MR. SAUNDERS.—The bark of the butternut is used considerably as a medicine. There is an extract made from it by grinding the bark and boiling it in water. It is used as an aperient.

MR. BEALL.—There is one statement made by Mr. Bucke that I must take exception to; he says that the foliage of the walnut and butternut are so nearly alike that but few persons can see any difference. Now, I rather conclude that Mr. Bucke has not seen many of those trees growing side by side; if he had, I think he would not have made that statement. From the beginning of the season onwards the butternut is much the lighter in colour, and from the beginning of August to the end of the season it is so much paler, it looks like a green faded out—so much so, that you can see the difference half a mile away. He also states that the northern limit within which the walnut is grown extends along the Grand Trunk Railway from Toronto to Quebec. I am quite aware that the map issued by the Government of Lower Canada, or from the office of the Public Domain of Quebec, states that that is supposed to be its northern limit; and that may be correct. But I think the northern limit of a nut-bearing tree, or any tree, should be considered the most northerly latitude in which the tree can be successfully grown. For that reason, I must place the northern limit very much farther north than Mr. Bucke has placed it, because I know it can be grown as far north as our North Pole town, Lindsay. I think the most northerly limit where it can be successfully grown is where the tree can be grown in a first-rate healthy condition—where it will bear its fruit every year, and bear in abundance.

MR. BUCKE.—I merely gave the limit to which it was indigenous; I stated that I thought it could be gradually extended.

MR. SAUNDERS.—I think this question as to the limit to which we can grow trees is in its infancy. The Deciduous Cypress, which has its home in Florida, can be grown as far north as London, and is perfectly hardy. It is a thing we did not anticipate until we tested it; and I have no doubt that the walnut and butternut would grow successfully throughout our North-West Territories if it were tried.

CHIEF JOHNSTON.—I had a long correspondence with His Excellency the Governor-General, in the course of which he ordered three barrels of walnuts. He has sent them to Inverary Castle, in Scotland, and is going to try and grow them. I also sent him some young trees three feet high, and those have also gone there. Here are our very desks and chairs, and even the Mayor's chair, made of that same wood; and do you know that the growth of that wood is going to be extended in our country? His Excellency is taking so much interest in our country and in our wood that he has actually taken the seed to Scotland to plant it. It is also going to be planted at Buckingham Palace. I am now planting all these nuts, although I have the trees already growing on my estate, and there are hundreds of bushels there now. Last fall I got a communication from Guelph, one from Mr. Campbell in Simcoe, and one from a lawyer in Penetanguishene, for seed to plant. All I ask is a couple of dollars a barrel for it. As Mr. Bucke has referred to the subject, I may tell you that the North American Indians have used the nuts for certain purposes for hundreds of years; and at the present time, my wife, who is an English woman, gets them and makes excellent pickles of them, which I prefer greatly to cucumbers—they have a certain taste that is most pleasant, if they are got at just the time of year when they are just so large that you can run a penknife through them. I think that not only the wood, but also the nuts, are of great value. There is a company in the United States whose agent has been all around my estate, and actually measured my trees to ascertain the number of inches through the butts; and they have offered to take out the roots themselves and saw them for gun stocks. There is a beautiful curl in the wood; and the value of the gun stocks made from it is from five to six dollars each. I intend to send one of those gun stocks to His Excellency for a curiosity. Then, this company offer me a dollar a foot for every foot of the trunk of every tree I have there which will make a stick a foot square, without my touching the tree myself. They actually offer also to take the limbs, which are as large as my body, and every fork, and saw them for veneering purposes.

BEST VARIETIES OF HARDY CLIMBING SHRUBS.

MR. WELLINGTON read the following paper:—

THE CLEMATIS.

No class of plants at the present time is exciting deeper attention or is deserving wider dissemination than the Clematis. Of all our climbers it is the most varied in the colour of its blossoms—the most showy and beautiful. For twenty-five years the admiration and esteem for this plant has been steadily increasing, until to-day it has no rival in point of excellence and popularity save the Rose. During the past twenty years of earnest and intelligent effort on the part of competent florists, this family of plants has been raised from obscurity to a place of highest eminence. The ever-increasing beauty of colour and profusion of bloom, in the later sorts, fully justifies the popularity of the Clematis. There are other reasons, however, which have caused this plant to become so great a favourite. Among climbers it has no competitor. It fills a place hitherto unoccupied; no rival to-day contests its supremacy or seeks to dethrone it. To the eye of the most critical, as well as the most uncultured, its graceful and trailing habit, its rich profusion of bloom, its adaptation to so many varied situations, renders it a source of unflinching delight—a study, the pet and pride of its fortunate possessor. The success attained so speedily with the Clematis affords great encouragement to a thorough and skilful system of hybridizing, and shows what endless combinations of colour and beauty may be developed in a class of plants now possibly existing in a state of obscurity. The Clematis is a climbing plant found principally in the temperate zone, having a woody stem and compound leaves, with tendrils which act like those of a grape vine and enable it to attach itself to any support. For many years the varieties *Flamula* and *Viticella*, which were known in England two centuries ago, maintain the foremost place. The flowers of the former are small, white, delicate and fragrant; of the latter also small, but produced in almost continuous masses, and of a brilliant blue or purple colour. From the *Viticella* in one of its many forms crossed with *Languinosa*, a splendid species from China, having a strong habit, and bearing very large lavender-coloured flowers, came most of the hybrids we now possess, so marvellous in their beauty. The credit of having brought the Clematis from its obscurity as a plant chiefly desirable for a screen for unsightly places, for one of the most showy of lawn and garden ornaments, is mainly due to Geo. Jackman & Son, of Woking, England; for while other florists had been hybridizing with some success, it was not until Messrs. Jackman had produced the *Jackmanii*, in 1862, that the marvellous capabilities of this family were understood and appreciated. From that time to the present the development and introduction of new varieties has been constantly going on, every season adding to the already lengthened catalogue. Indeed, we fear that this production of new sorts has been somewhat overdone, and too little discrimination has been used in preserving qualities of marked excellence and distinctness. Upwards of one hundred and fifty varieties are now offered by European growers, and it must be confessed that in colour and form some of them are hardly distinguishable the one from the other. We fear that possibly some harm has been done in a too eager effort to multiply varieties: at the same time it must not be forgotten that the flowers of the Clematis appear very different at different stages of development, and many are in consequence led into error. In handling this plant extensively, we have been the recipients of many complaints to the effect that “the Clematis you sent me were all blue or all purple,” the writer seeming to be as little able to distinguish between these two colours as they were to see the point of difference in the plants. Now, if we take, for instance, the four varieties—*Jackmanii*, *Rubella*, *Alexandria* and *Rubra-Violacea*—at certain stages of blossom, they will appear almost identical, even to the most practised eye; indeed we had *Alexandria* and *Rubella* on our table last summer which we were utterly unable to tell apart, and yet as the season advanced and we watched developments we found the contrast to be very marked and striking. During the hot months of summer the brilliant shading of the blossom quickly fades, and hence the identity in appearance of varieties having

the blue or purple as the predominant colour. It is our experience that the Clematis shows the gorgeous brilliancy of its hues, the delicate pencilling and shading of the bloom to the best advantage in the fall, when the rays of the sun are less direct and intense. It is then that these indescribable tints are produced, so marked and so beautiful to the eye, and yet wholly impossible to reproduce on paper or canvas. In the fall, also, the bloom is very profuse and is long maintained, the early frost having little or no effect upon the blossoms; indeed, we think they only serve to bring out the rich shadings more distinctly. It is not until the hard freezes come that the flowers succumb. This free and late blooming propensity in the Clematis is of the utmost importance. We have absolutely nothing in the way of climbers to fill the place; for autumnal blooming roses, although they give us bloom sparingly, yet the flowers begin to discolour and lose their charm with the early frost. While there is some confusion as to the identity of varieties, as explained in the foregoing, it must not be understood that we would utterly condemn any of them, or that we claim they are one and the same thing. They are not, and almost every one we have become acquainted with has merits distinctly its own; and not only so, we have been able sooner or later in the season to recognize striking points of difference in the blossom of kinds that at one time seemed alike, as well as the claims put forth in the descriptions of the originators. To the amateur who has a keen desire for collections, who admires fine points, as does the breeder of fine cattle or poultry, these features of similarity will be only a source of study; he will take pride in watching the fine points as they develop, and will ever see new beauties that would escape a less cultured discrimination. To the average planter, however, it is a matter of importance to obtain varieties that show strong contrasts, as his assortment will be limited and he wishes to produce the most striking effect. The predominant colours in the Clematis are blue, purple and white. There is only one red that is worthy of the name, and even that comes very far short of what the imagination seems to picture it. This is the *Viticella Rubra-Grandiflora*, which is small in flower compared with many other sorts, and of a dull, uninteresting red; a sort of brick colour, in fact, rather than the bright red many seem to fancy it. It is, moreover, rather an indifferent grower.

Clematis Jackmanii.—Among purples still maintains its rank, and probably will never be deposed. An exceedingly strong grower and free bloomer, it never fails us. It is indispensable in any collection, and if a man can have only one Clematis, let it be *Jackmanii* always.

Velutina Purpurea.—Is another fine purple, darker than *Jackmanii*—darkest of all. It has a peculiarly velvety-blackish appearance, and is a free bloomer, with large flowers.

Rubella.—A rich, winey purple; blooms freely late in the season; flowers large; and plant very robust and vigorous in habit.

Gem.—This is a perfect blue, bright and showy; the plant of good habit, and the best of this colour; flowers large and abundant.

Lady Boville.—Another blue; not so large in size or flower as *Gem*, but clean cut and striking; habit vigorous.

Languinosa Candida.—This is one of the most desirable of the whites. It produces very large flowers, of a greyish white at first, which afterwards turn to a pure white. It is indispensable in a collection, and thrives in any place suited to the Clematis.

Henryii (Anderson's).—To our mind there is no white that equals the *Henryii*. There is something peculiarly life-like, almost speaking, in its bright, compact, clean-cut blossom. It has, we think, more constitutional vigour than any of the whites. It is a pure white, and seems less liable to blister or discolour from the sun's rays, and therefore holds the flower in its beauty longer.

Lawsoniana.—The European descriptions say "A rosy purple." We should call it a deep mauve, the purple tint almost immediately disappearing after the bud opens. It is unquestionably one of the greatest acquisitions among Clematis, producing flowers in continuous succession, very showy and beautiful, and the plant remarkably vigorous. It is almost, or quite, as indispensable as the *Jackmanii*.

Star of India.—Is a very showy and free flowering sort, of violet-purple colour, with turkey-red bars through the centre of each flower leaf; very striking—the best of its type.

Magnifica.—Another variety of the Jackmanii type, but distinct and effective in having red bars through the centre of each flower leaf.

Marie Lefebvre.—Probably the handsomest of all the Clematis yet introduced. A pale silvery mauve, with deeper mauve-coloured bars through the centre of each flower leaf. Not yet extensively grown, and possibly lacking in constitutional vigour. A further test of this variety is desired, in order to understand its full merits, but in beauty of flower, in our mind, it is unsurpassed.

Eccelsior.—Somewhat double in its habit, with flower six inches across. The colour is greyish purple or mauve, with plum-coloured bar; exceedingly beautiful and promising.

The foregoing varieties represent, perhaps, the best of the types. Other sorts have their varying peculiarities and merits. We do not feel as if we could part with any of them, greatly as the list is extended, and we have never yet met with a person having one of the approved sorts growing, of whatever name, or however so much like other kinds, who was willing to part with it.

Hitherto we have only spoken of the perpetual flowering Clematis, believing, as we do, that the perpetual habit is of the greatest value, and will commend itself most generally to the planter; and in a cold climate like ours they are particularly desirable, from the fact that they produce flowers from the new growth each season which spring from the root. The past season's growth is therefore of no consequence. It will die, leaving the root, the only valuable part, and this we can protect by mulching, and carry through the most severe winter with perfect safety. The spring blooming kinds should not, however, be overlooked. They flower from the old or ripened wood of the previous year's growth, and consequently when in bloom present a more abundant and massive appearance than the perpetuals. Some of them, like Lucie Lemoine and Vesta (whites, and the latter fragrant), are very double, as much so as many kinds of roses. These sorts and many others are wonderfully beautiful, and deserve a rank little inferior to the perpetuals. They are very superior as pillar or trellis plants.

As to the position which the Clematis may occupy, there is scarcely any place where they are inappropriate. They are excellent upon the lawn as pillar or stake plants, or growing upon the stumps of trees; in beds or borders in the garden they cover the surface with the richest carpet of brilliance and beauty; for trailing upon verandahs or trellises and arbors, there is nothing so effective and pleasing; over mounds of rock-work, with an intermingling of varieties of different colours, they present an appearance of marvellous beauty; and as pot plants, trained upon wire frames of any desired shape, they have few equals.

Having thus described the Clematis and pointed out some of its characteristics, we are now to consider the best methods of growing. Our own experience would lead us to say success depends upon high culture. It transplants well, but is a gross feeder; you can scarcely over-feed it. Select a good rich soil in the first place, and then annually or oftener supply heavy dressings of rich, well-rotted manure, thoroughly incorporating with the soil. Frequent applications of liquid manure will be found very beneficial and amply repay time and trouble. The perpetual qualities of the plant are not fully brought out unless kept constantly growing, and to do this it is necessary to supply unfailing nourishment. In the fall, before freezing weather sets in, mulch heavily, from four to six inches deep, with well-rotted compost, spading into the soil in the spring before the plants begin to start. We do not know of any better system of culture than this. It has never failed to produce the most satisfactory results with us. Should the soil become heavy we would loosen it with an application of sand or sandy loam.

We now reach a most important question—Is the Clematis sufficiently hardy for Canada? We have for several years past handled the Clematis largely in Canada, importing most of our stock direct from Europe.

For the past two years we have propagated ourselves a good many thousand plants, and now have over forty of the best varieties at our nurseries—all of which have blossomed with us.

We have given the Clematis special attention, and as far as possible ascertained what success our customers have had in different parts of the Dominion. We have sent plants from Sarnia to Halifax, taking in all the most important points in the different Provinces,

and have never heard of a single case of winter-killing in the Clematis. In Toronto and Montreal alone we have sold several thousand plants, and there is nothing we have handled that has given better satisfaction. They carry and transplant easily, and with any fair average usage the plant is sure to grow. If liberally fed the plant each year increases in strength and number of its shoots, and consequently the number and size of its brilliant blossoms. At two years of age the Clematis is large enough for the nurserymen to send out, and it usually requires two years from planting for it to show the beauty and size of its flowers. They generally flower the first season, and it is not uncommon for them to give grand results when well cared for. One gentleman in Montreal wrote us that the Clematis we sent him (a white) had the first season grown over 15 feet, and had produced from 70 to 80 blossoms, some of which measured six inches across. To show the capabilities of the Clematis we quote the following from a letter written by Mr. Fowler, Lord Polwarth's gardener, whose estate is about forty miles from Edinburgh:—

"The plant in question was planted five years ago, from a four-inch pot, against a wall with an eastern exposure. As the garden walk passes close by the wall, and consequently over the roots, I had the ground well prepared at the outset. The natural soil being light, upon a gravelly bottom, I added a mixture of one-half heavy loam and one-half natural soil, with a considerable quantity of well-rotted manure, incorporating them well together, and beating down the whole before planting, to make the walk solid.

"In order to protect the tiny stem of the plant from injury, I had two short boards nailed together in the form of a V, and placed against the wall. The plant made several shoots, which were carefully nailed in as they grew. The only attention it has required since has been the pruning off of the old flower stalks and leaf stems, and the equal distribution of the branches. I have it now trained over a surface of 15 feet square, and it is capable of covering a much larger space had it been at my disposal. I have never pruned off a single living bud, but as they burst into growth have had them neatly tied in. Thus treated, they flower in wonderful profusion from early summer until late in autumn. At the beginning of last September the flowers on this plant were counted, and the number then open was found to be 1,275—the grand effect of which can scarcely be imagined. The plant well deserves the popularity which it has gained, being perfectly hardy, easily managed, and unrivalled in colour and flowering properties by any climbing plant I know."

We believe the Clematis in Canada capable of as fine results, for we are satisfied it is thoroughly hardy, and one of the few shrubs of value that the Canadian florist should propagate largely. The spring bloomers, which flower from the old wood, we do not think sufficiently hardy for general culture in Canada. In Western Canada they should do well, but our own experience has not been extended enough to warrant us in advising their general planting.

MR. BEADLE, seconded by Mr. SAUNDERS, moved that the thanks of the meeting be given to Mr. Wellington for his paper; and that he be requested to allow it to be published in the Annual Report.—*Carried.*

MR. SAUNDERS.—There is one hardy climbing vine, a native, which I think a great deal of, but which is not very much known; it is the Wild Yam, or *Dioscorea villosa*, which is remarkable for the beauty of its foliage. The colour is a dark green; the veins, or ribs, of the plant are very deeply impressed, and the leaves hang over each other in such a manner that when the plant is nicely trained against a wall it presents an appearance almost like that of tiles on a roof. There is another climbing vine not much known, but which is also valuable; that is the Dutchman's Pipe, or *Aristolochia siph.* It is a native of the more northern portions of the United States. The foliage is very large and handsome. The vine is a very rapid grower, and besides that the flower is very curious and beautiful, resembling somewhat a pipe in form. Another of our natives is the climbing Bittersweet—the fruit of which will be illustrated in the group of berries and fruits in the next number of the *Horticulturist*. It is a well-known climber in many parts of the country; in other portions again it seems to be very little known. The foliage is very handsome throughout the season, being a bright green; and in winter, when hung with scarlet berries, it presents a very pleasant picture.

MR. ARNOLD.—I endorse what Mr. Saunders has stated with regard to the pipe vine. If I were confined to one climbing shrub I would take that. It is perfectly hardy; it needs no protection in the winter anywhere. The flower is a curious one. I would advise everyone who smokes to get one, and use no other pipe but the Dutchman's. It is evidently the pattern from which the meerschaum pipe has been taken. It is rather difficult to copy it. I do not know how to propagate it from cuttings, and it takes two or three years to grow it from layers. The next climbing shrub I would choose would be the *Wistaria Sinensis*; it bears large racemes of flowers, sometimes a foot long, and really beautiful. There is also the Trumpet Flower—another very fine climber. The roots take hold well. Those varieties of Clematis that flower on the old wood have not been satisfactory to me; it is very few that will stand our winter; but the *Jackmanii* may be killed down to the ground every year, and yet it will grow every year and be full of blossoms.

MR. WELLINGTON.—There is another climber that I would like to call attention to. It has no flower; it is the *Ampelopsis Veitchi*. I think it will grow anywhere that the *Aristolochia* will. It resembles our American ivy, only it is more handsome. It is in great demand. In fact, it is in such great demand that many American dealers are unable to supply it to all their customers; and our buyer in England was unable to get it—it is picked up so rapidly.

MR. BEADLE.—I have not much to add. The *Ampelopsis Veitchi*, which Mr. Wellington speaks of, I find to be perfectly hardy in St. Catharines. It has climbed up the end of my house, and clings to the bricks by its rootlets. It is very much like the ivy. My impressions are that it does not colour up so in autumn quickly as our *Ampelopsis*. The climbing Honeysuckles our friends are all familiar with; they are mostly very sweet-scented. Hall's Japan Honeysuckle and the old Sweet-scented Honeysuckle are very valuable climbers in my hands. The old Sweet-scented Honeysuckle kept blooming for such a length of time that I thought it valuable on that account. These plants are very hardy. Sometimes we get a winter that kills them some; but we cut out the dead wood, and they come on again; and it may be several years before they get any injury again. The Trumpet is very pretty, but I prefer the scented varieties.

MR. BEALL.—What is the best means of getting rid of that insect that the Honeysuckle is troubled so much with—that little grey insect?

MR. BEADLE.—I have not been troubled with it, but I have this idea that a little diluted carbolic acid would be the best thing for the coccus.

MR. BEALL.—I would like to ask Mr. Wellington if the Clematis has any insect enemies, and if so, what they are.

MR. WELLINGTON.—I have never found that they have. A few in our grounds died down from some cause or other—we never found out what; but the most of them sprang up the next season.

MR. WOODWARD.—With us the Clematis is very much inclined to be troubled with—I think it is—the Wool Aphis. It is a woolly sort of insect. In my grounds where that appears, we dose it with whale oil soap water.

MR. MORRIS.—I have noticed this about the Clematis, that they will die down for months, and then all at once they will make a shoot and go right on again. I have been told that they sometimes remain in that down state for a year.

MR. SAUNDERS.—I have noticed the Clematis eaten off by the Cut-worm; but afterwards the buds have formed—after you have concluded they have died out.

The Association adjourned at half-past twelve until two.

Upon its re-assembling, Mr. ALLEN read the following paper:—

REPORT ON NEW FRUITS.

To the Ontario Fruit Growers' Association.

While your Committee has been comparatively diligent endeavouring to search out the list of fruits, either new or lately introduced into this Province, we have to ask for—

bearance upon the result, and trust that the occasional mention of old varieties in this report will, under the circumstances, be excused.

STRAWBERRIES.

Sharpless.—The reports upon this much praised variety have been very varied. From Toronto and some northern sections we have glowing accounts of it as hardy, very prolific, strong grower, stooling out well, handsome berry, firm and a good colour, flavour fine, and altogether very promising. From other sections, Niagara district, and generally through the west and some sections east, it has not given much satisfaction, some claiming that upon heavy soil it succeeds best, while others are willing to discard it altogether. The more generously inclined, however, are willing, nay prefer giving it further trial.

Crescent Seedling bears a very good character generally over the Province, indeed the choice seems to be between this and Wilson for the million, opinion being pretty evenly divided. If the *Crescent* was as good a shipper as the *Wilson*, it would evidently receive a verdict by a good majority. *Crescent Seedling* is variously described as over medium size, uniform, bright red, plant hardy, very productive, flavour medium to good.

New Dominion is gaining in favour, especially as it prolongs the strawberry season up to the first ripening raspberries in many sections. It is hardy, a free grower, berry large and handsome and flavour good; for a family berry it is valuable, and although it is not generally spoken of as a shipper, it commands the top figure on local markets. Growers in the Ottawa district say it has few equals.

Early Canada.—A new variety grown by Mr. A. M. Smith, of St. Catharines; it is a seedling from *Wilson* and resembles that variety in many respects, colour and flavour almost identical, but it comes in about a week earlier; it is very productive and hardy, and altogether a variety that we would like to see further tests of. Already it has been tried on various soils in the western counties and also in the Ottawa district, and the reports given go to shew that it is valuable for market. One extensive grower reports that he has such an abiding faith in its good qualities that he has planted largely of it for profit.

Mary Fletcher.—A new variety, originated in Nova Scotia, said to be very hardy and of an improving turn; its flavour is superb, and while it may never become a valuable berry for market, it is an acquisition to the amateur who possesses an exquisite palate.

Alpha (No. 8).—One of Mr. Charles Arnold's; very early, hardy, productive, some growers say it is equal to *Wilson* in productiveness and much superior in flavour. The berry is very firm, one of the best for shipping; it is a great favourite in the Ottawa region as well as through the northern and western counties.

Arnold's Pride (No. 23).—A very large conical seedling, dark red berry, productive. The fruit is borne in large clusters on long strong stalks; leaves large, very dark green on large strong stems; quality of fruit good, ripens ten days later than *Alpha*. In the Ottawa, Prescott and Peterborough sections this is considered a valuable berry, and one Huron grower says he can satisfactorily fill the bill with this and the two last named varieties—*Mary Fletcher* and *Alpha*.

Bright Ida (No. 3).—One of Mr. Arnold's promising varieties; an enormous bearer, hardy strong grower, fruit large, bright red, flavour good, rich fragrance, firm berry.

Maggie (No. 4).—Another of Mr. Arnold's; luxuriant grower, dark green foliage, strong, good bearer, ripens with *Wilson*, fruit large, dark red and much richer flavour than *Wilson*.

Great American is not generally well spoken of, said to be treacherous, giving with extra care and cultivation an abundant yield, and under other circumstances often proving a complete failure.

President Lincoln has only been spoken of by a couple of growers who say that it is very sweet and fine in flavour, strong hardy grower and fairly firm fruit.

Miner's Great Prolific resembles the *Charles Downing* in many respects, but larger, better adapted to variety of soils, of a darker color and a more even cropper.

Glendale is recommended for its lateness and good shipping qualities. It has not been extensively tested yet, however, but promises well.

RASPBERRIES.

Cuthbert has not yet been tested sufficiently to enable us to form an opinion, but where tried growers report it as "promising," its large size and bright red colour, together with productiveness will make it popular, providing it is hardy enough to live through a Canadian winter such as the present. One grower in Bruce county who has tested it, says that it is not hardy, and it winter killed a year ago in Waterloo.

Queen of the Market is claimed by some to be *Cuthbert*, and when we examine the fruit there seems to be no difference whatever; the canes, too, resemble each other very much, although some of the best American growers claim it to be quite distinct from the *Cuthbert*.

Niagara.—One of Mr. A. M. Smith's seedlings, a cross between *Clarke* and *Philadelphia*, and in many respects bearing their characteristics, but it comes in for market later, which is, at the present day, a very valuable point in its favour. In size and quality it surpasses its parents and altogether is likely to become valuable for market. We would strongly advise a free and extended trial of this new aspirant.

Diadem seems to be the favourite yellow raspberry on account of its high fine flavour, it is said to be quite hardy and productive and has but one fault, if such it can be termed, that it belongs to that modern class, the *Sports*. Upon one occasion at least a single cane was known to have produced berries of two opposite colours, although possessing the same flavour.

No. 10.—One of Mr. Arnold's hybrids; very large, dark red, productive, and of excellent flavour, one of the hardiest yet grown by that celebrated hybridist.

Saunders' Hybrids.—Crosses between red and black varieties, have a value peculiar to themselves in their quality for cooking and canning, they are very hardy and productive, colour alone being against them (a dark brown). *No. 69* is early and productive. *No. 70* would follow 69 in season, a fine large berry. *No. 55* is late and productive. *No. 72* is a cross between *Doolittle* and *Philadelphia*; it partakes largely of the peculiarities of both parents, the berry is something larger than *Philadelphia*, of a dark reddish or purple colour; it is one of the hardiest varieties yet tested in the Ottawa and Cornwall district, a strong grower and very productive. The chief drawback to it is that it does not sucker and seldom roots at the tips, and hence the canes have to be laid down in order to secure fresh plants.

Seedlings from the last described raspberry have been raised by Mr. P. E. Bucke, of Ottawa, very successfully. Mr. Bucke reports that he has a dozen of such seedlings and all are different, one white, two black caps and the rest red. Amongst the latter there is a considerable difference in the colour of the stems, characteristics of leaf, and size and shape, of berries—in some the seed lobes are large and in others small. The fruit as a rule is larger than the parents, and the black are perhaps a little more juicy than the original *Doolittle*. This is an interesting experiment, showing the intimacy of Mr. Saunders' cross, the seeds of which revert back to the original types in the second generation. These seedlings are hardy and the black caps root strongly.

Gregg is one of the most promising black caps ever introduced, hardy, an immense bearer, large and best quality; being later than most other varieties makes it of extra value.

BLACKBERRIES.

Snyder is claimed to be very productive and some say of a finer flavour than *Kittatinny*, but we believe the latter to be the best for all purposes.

Thimble Berries, so called probably because of their resemblance to the shape of a thimble. They are to be found wild in many sections of the country, in the northern sections of this Province, along rocky ridges, etc. The plant is undoubtedly extremely hardy, the canes are immense in size and resemble *Mammoth Cluster* in vigour of growth and appearance; it propagates freely by suckers, immensely productive, fruit clear black, sweet, flavour quite distinct from any of the cultivated varieties of this class; it makes a fine preserve and requires but little sugar; in pies it is delicious; it ripens in August and can be shipped a long distance on account of the firmness of the berry. In markets where

it is known and appreciated it is eagerly bought up at from fifty cents to one dollar per pail. We would recommend some of our enthusiasts to make a closer acquaintance with this variety, bring it into thorough cultivation and cross it with some of other varieties. The experiment is well worthy of trial at least. We believe this berry to be valuable as it is, but a proper cross might produce something marvellous. There are other varieties of this berry, similar in growth and colour of fruit, but the canes are more slender and the fruit is of a coarser flavour and in shape nearly round.

CURRENTS.

Lee's Black Prolific is becoming a general favourite where thorough cultivation and feeding is bestowed; the bunch and berry is much larger than Naples, and quality for preserving very much superior. It comes in early and is enormously productive; but in order to reap full benefits it is absolutely essential that thorough and regular manuring and cultivation be employed.

Saunders' No. 35.—A black currant seedling, very productive and of superior quality, said by some even to surpass Lee's.

Saunders' No. 42.—Another black seedling, very productive, large, and much sweeter than Naples.

Saunders' Seedlings.—Red, resembling Red Dutch in bush and cluster, but of a much brighter colour; flavour very agreeable; promising.

GOOSEBERRIES.

Houghton's Seedling is more generally spoken of, and more favourably than any other.

Downing's Seedling, while spoken highly of occasionally, is frequently reported against as not so productive nor so valuable for market. It has proved worthless in some sections of Northumberland County.

Charles Arnold.—A cross between Houghton's and Ashton's seedlings (one of Mr. Saunders'); is large, dark red, good.

Beadle.—A cross between Downing's and Ashton's seedlings, is an upright grower, fruit good in quality and large, productive.

Dempsey.—A cross between Houghton's and Roaring Lion, reported as Saunders' No. 17, is considerably larger than Houghton, immensely productive, good.

Pearl.—A cross between Houghton and Warrington, larger than the former, very productive.

Beauty.—Another from the same cross, larger, but not so productive.

Ruby.—A cross between Houghton's and Ashton's seedlings, beautiful red berry, very productive, fine, of a drooping habit.

We are of opinion that all these varieties are possessed of value and should be brought more prominently before the country. With that end in view we suggest the advisability of propagating from all of these on the grounds of the Guelph Model Farm, so that our Association can have them distributed extensively in order to obtain a better test of value.

CRANBERRIES

Are reported as growing wild in marshy spots along the shores of Lakes Erie and Huron and in the Counties of Middlesex, Lambton, and Bruce. In one case a report comes of a farmer who has nearly two acres of such marshy land covered with plants which bear a good crop of berries every year; it is on the banks of a small inland lake where the surrounding grounds are flooded every spring, so that grass is pretty well killed out. Where a proper situation can be had for flooding the grounds late in spring there is probably no crop that will give so large a return of clear profit to the acre as this, and we only wonder when we see pieces of land, well suited for the purpose, lying waste or used year after year in marsh pasture, while it might be yielding a much larger return under a crop of cranberries.

GRAPES.

Brighton.—Reported from Northumberland, Essex, Simcoe, and Perth as a strong grower, a regular and abundant cropper, the vine quite hardy and fruit good quality. Two reports agree in stating that the fruit must be used soon after ripening, as it soon loses flavour.

Moore's Early ripens a week or ten days earlier generally than the Concord, a larger grape and of about the same grade as to quality, although some claim it to be superior; indeed but for the fact of its ripening earlier the majority would seem to give the first place to Concord for early market value. It has not yet been tested extensively in Ontario, and we would not be surprised to find that after a better trial *Moore's Early* would have to be satisfied upon the whole with second place.

Abyssinia.—One of Mr. W. Haskins' hybrids, a cross between Creveling and Hamburg, free grower, bunch medium size, berry large, quality fair; would like to see it tested further.

Albino.—Another of Mr. Haskins' hybrids, a hardy white grape, strong grower, productive, foliage fully equal to Delaware, bunches well shouldered, flesh firm, flavour medium to good, a promising grape. Mr Haskins has also a white or rather yellowish grape, a cross of Concord and Allen's hybrid, very prolific and hardy, strong thick foliage, compact and large bunch, but quality is not up to the desired standard if we judge by the specimens we examined at the late Provincial Exhibition.

White Delaware follows Delaware in form of bunch and size of berry, flesh firm and pleasant, skin partakes of the choke cherry nature when chewed.

Seedling A.—From Hartford and Hamburg, dark, juicy and pleasant.

Pearl.—A white grape from Delaware by White Muscat, seems to lack character to make it of value in its class.

Janesville is reported on from the eastern part of the Province as hardy, early and valuable; some claim it to be better for value than Concord; other reports again place it as medium, while some say it is not worthy of cultivation. Upon the whole a majority speaks strongly in its favour, and we would like to have it further tested and reported upon, as it appears to be promising.

Lady.—A Concord seedling, white, said to be a few days earlier than its parent, skin tender, liable to crack, vine strong and vigorous, quality good.

Dempsey's No. 18.—White, ripens with the Burnet, quality good, but vine a feeble grower.

Dempsey's No. 4.—Black, resembles Burnet but smaller, ripens about same time and of about same quality; it is a cross of Hartford and Black Hamburg; it has some of the flavour of the latter.

Corinthian.—It has been suggested by one of our fruit enthusiasts that this variety should be tried in Ontario. This is the grape vine upon which the dried currants of commerce are grown; the fruit is small, but the vine is enormously productive. We doubt very much if the *Corinthian* would succeed here, but would like to see the matter tested as a new industry might spring up should success happen to crown such an effort.

Croton is only referred to by correspondents from two sections, where it is spoken of as a medium grower; fruit ripens very early, quality excellent, bears regularly and abundantly, but, says a Northumberland grower, "the vine is tender and requires careful protection."

Burnet.—It is surely very gratifying to hear favourable reports of trees and vines sent out by the Fruit Growers' Association. During the past two or three months we have had reports covering a very large portion of this Province upon the Burnet grape, and generally speaking they bear undoubted testimony as to the value of this new grape. Out of some forty-seven reports from different sections we only received six that gave anything but the most flattering accounts. Of these six some say that fruit does not set well, two say theirs mildewed slightly, and one that the vine was not making a strong growth. Altogether we conclude that the vine is hardy, a strong, vigorous grower, and the fruit of excellent quality as well as early. We also believe that the fruit does not always set well on the young vines, but patience for a couple or three years will, we feel sure, give an

entirely different and satisfactory result. Several growers complained that the birds took the fruit as soon as ripe. We admire the good taste of the birds, and score one for their excellent judgment.

Early Dawn.—A seedling of Israella, black, resembling Crevelling but not so good a grape; flavour fair, bunches small, berries round, a good grower, but not to be compared with many other older varieties for general cultivation.

Dempsey's No. 25.—White, bunch and berry large, vine hardy and strong grower, productive, quality good; in some cases it is said to ripen too late to be of value for general cultivation.

Lady Washington.—One of Mr. Rickett's seedlings, one quarter exotic; said to be a vigorous grower and good bearer, large bunch, quality fair to good, liable to mildew.

Pocklington.—White or golden yellow, fine large bunch and berry, sweet when fully ripe, pulp rather tough, inclined to shell badly when ripe, hardy and a good grower, but too late to be valuable for general cultivation, quality medium, third rate in its class.

Champion.—Early but of poor quality and not worthy of general cultivation, does not ripen evenly on the bunch, subject to rot. On account of hardiness it may be valuable in the colder sections of Ontario.

Prentiss.—White, a seedling from Isabella, vine hardy, a strong grower, thick healthy foliage, very productive, ripens with Concord, bunch and berry about the size of Concord, an excellent shipper and keeps well, quality good to very good. We hope to see this grape tested in Ontario, and we believe it will give satisfaction.

Senasqua.—A black grape originated in New York State, a seedling of Concord fertilized with the Black Prince, vine said to be hardy and a vigorous grower, bunches medium to large, compact, berry not quite so large as Concord, quality good to very good.

Niagara.—White, from Concord and Cassady. From all accounts this appears to be the hardiest yet, the vine is a remarkable grower and ripens wood to the very tips early in the fall, foliage thick, deep green, leathery, luxuriant, holding its colour and freshness from the base to tips of the stem after other varieties have been browned and crisped with frost. From character of wood and foliage we think that the Niagara should succeed as far north as any known variety. It is an immense bearer, bunches large, shouldered and very compact, berry fully as large as Concord, quality and flavour peculiar to itself, best, rich. After testing all the varieties we know of on the catalogues our desire for a really fine fruity grape would invariably bring us back to the Niagara, and after testing and retesting over the tables we would still come back to Niagara, with a strong desire to remain. It has a tough thin skin, not liable to crack, melting and delicious to the core, with a fine rich aroma. As a keeper and shipper it has no equal that we know of, and while it ripens as early as Hartford Prolific, it will remain to the latest without losing in appearance or quality. Truly we have found in this all that can reasonably be desired for a white grape for the million. The Niagara will be ready for distribution in the spring of 1882.

Jefferson.—Red, one of J. H. Rickett's seedlings, a cross between Iona and Concord, vine a strong grower, short jointed, leaves very large and leathery, bunch large, shouldered; berry medium, roundish oval; flesh tender, sweet, pleasant, quality good; ripens about same time as Concord; a promising grape; has not yet been tested sufficiently to know whether or not it will be suitable for general cultivation in Ontario.

CHERRIES.

The only new cherry that we know of worthy of note is one grown on the banks of the Maitland, near Goderich. Mr. Charles Arnold, of Paris, has tested this cherry and pronounces it very good. We have seen it growing for years but have not been able to trace the history of the original tree; it is supposed, however, to be a chance seedling; the tree is a hardy, strong, vigorous grower; the fruit resembles Napoleon Bigarreau and nearly as large; for preserving there is none better; for shipping we never saw its equal, if need be it could easily be shipped across the Atlantic in prime condition; it is an immense bearer, the fruit grows all along the limbs and not on spurs like most other cherries; it ripens after the other cherries are about over. It would be well to secure grafts of this variety and have it thoroughly tested at our experimental grounds at Guelph and fully reported upon.

PEACHES.

Early Louise.—Our reports of this variety are very varied. Some Niagara district fruit growers tell us that it is too small and flavour not good enough to make it a valuable market variety. From others in the same district and from Lambton County we hear that the Louise is a good peach, very productive, and resists the frost better than most varieties.

Beatrice.—A great bearer, inclined to over bear if thinning out be neglected; fruit high coloured, but too small to make it a valuable market peach, too soft to ship well excepting for a short distance.

Amsden's June, Alexander, Early Canada.—One grower, who is a close observer, says of these three, that "if you shake them up in a basket you cannot pick out the separate varieties, they are all so much alike." All three have been claimed to be free-stones time and again, but testimony does not bear this claim out, nor does our experience; on the contrary they appear to be clingstones of a type that would try the patience of a saint. But they are *early*, and that is an important point where commercial value is considered. Amsden is on the small side, and in this respect at least the other two have an advantage. Upon the whole the choice is almost equally divided between Early Canada and Alexander, with the preference slightly in favour of the latter.

Early Rivers has not yet been tested sufficiently to warrant our passing judgment upon it fully; present opinion gives it as a good bearer, fair size, straw colour, slightly tinged with red, thin skin and fine grained delicate flesh, tender, melting; it will never become popular as a shipper to a distant market, but will suit a near market very well; in some sections this is claimed to be very valuable on account of its ripening just after the earliest sorts and thus filling up the gap between them and the Crawfords.

Hales' Early appears to have redeemed its former rather bad character for rotting; it has been a good crop the past season with most growers.

Waterloo ripens a week earlier than Hale's Early, and as far as tried promises fairly well.

Barnard's Early is spoken of in Lambton as the climax of excellence, that it is very productive and should be largely cultivated.

Foster is esteemed in Huron and Essex for fine flavour and high colour.

Otto's Seedling.—Yellow flesh, an excellent peach for shipping, good bearer and hardy, medium size.

Mr. P. Pincombe of Strathroy, has a large greenish-coloured yellow flesh seedling, quality good. Mr. B. Gott, of Arkona, is propagating it, and we will have a fuller report from him no doubt when he discovers the value.

Mr. George Cox of Goderich township has a number of seedlings. Our chairman examined them the past season and selected the following as worthy of more general cultivation. *No. 1*, ripe about 1st September, free stone, large rich yellow flesh, flavour resembling Early Crawford, tree old and a regular and heavy bearer. *No. 2*, very large, high coloured, tree heavy bearer and strong grower, slightly cling, flesh light coloured and delicious, ripe September 5th. *No. 3*, light coloured with fine cheek blush, juicy and delicious, free stone, very large, ripe September 5th to 10th. *No. 4*, light coloured with cheek blush, free stone, flesh straw coloured, very juicy with an agreeable tart flavour, ripe September 2nd to 6th. These trees are old, very large and thrifty, and regular and abundant bearers. In the market these peaches bring as high a price as any of the regular varieties, while general seedlings do not as a rule bring more than one-third as much.

Mr. W. H. Doel of Doncaster, near Toronto, has a very large seedling peach, light coloured with delicately blushed cheek, yellow flesh, free stone, flavour and form resembling Salway with a trace of Late Crawford. The tree is about five years old and appears very hardy; the fruit clings well to the tree. The past season this tree bore a heavy crop; ripe about the last of September.

Mr. Hugh Walker of Paris, has a seedling which fruited on his grounds the past season; fruit very large, yellow flesh, free stone, quality good, flavour strongly resembling Early Crawford.

Collingwood or Parke's Seedling.—The past season this tree bore a good crop; fruit

large, high coloured, yellow flesh, ripened about 6th September; tree hardy and a fine grower and abundant bearer. Up to date the wood appears fresh and not likely to be injured, well ripened to tips. Mr. Gamon, the originator, has other seedlings, but none of the same apparent value or quality as this. This, we believe, is the first instance of success in peach culture in the Collingwood district.

PLUMS.

Moore's Arctic.—A native of Vermont; it is largely grown and highly thought of in New Brunswick, and is undoubtedly valuable for general cultivation, succeeds in the coldest sections where scarcely any of our other varieties will succeed; fruit dark purple, medium size, enormously productive, free from rot, good for both table and cooking, tree a free grower. The Messrs. Leslie of the Toronto Nurseries have this valuable variety in stock.

Greenfield.—A handsome red plum, good flavour, early and immense bearer, said to be a seedling of the *Magnum Bonum*, but the foliage gives unmistakable indications of a wild origin, and therefore we think it quite likely that the parent has not been as supposed. This plum is found in the Ottawa region, it is larger than any of the wild varieties; when fully ripe it is sweet and juicy, the stone is rather large; 40° below zero has never had the slightest effect on the fruit buds or the tree. This variety is being tested in the North-West, and we believe good accounts will be heard of it in a year or two.

Mooney.—A large red plum somewhat resembling Pond's Seedling, claimed to be superior to that variety and quite distinct.

Glass' Seedling appears to be generally a favourite, but almost every grower has a trick of suggesting that there is no difference between it and Quackenboss. Some of us held this opinion from the first, but did not wish to speak of it for fear of wounding the feelings of friend Glass; besides we believe it to be really a good plum whether it be called by the one name or the other.

Mr. Dougall, of the Windsor Nurseries, has several varieties of seedlings, some of which have already fruited and show promise of excellence. They are being tested and will be reported upon in due time.

We have in view for future report what at present appears to be a very valuable plum. The original trees, nine in number, were found wild about forty-two years ago in the Township of Downie, County of Perth, from which they were transplanted; they are still alive and bear a large load of fruit every year; the fruit is red, with a strong tinge of yellow and distinct yellow spots mottled through; size very large, quality rich, sweet, juicy, delicious, the best red plum we ever tasted, one of the best to eat when fully ripe; makes a delicious preserve; the tree is hardy without doubt, and has so far proved *Curculio* proof; the rot has never been seen in these either, while both *Curculio* and rot abound in other varieties in the same orchard.

We find many orchards in the County of Bruce planted with wild plums, and although none have been seen equal to the one just described they all appear to improve under care and cultivation. Indeed it appears to us that more attention ought to be given to our native fruits by growers; there is no doubt but most excellent varieties may be found by bringing them from their native wilds and applying cultivation, crossing, etc.

Goderich.—The finest plum grown in the Huron district; cannot be placed among known varieties; the original tree is large and in prime bearing order; the origin is not known, and although specimens of fruit have been submitted to eminent authorities upon such fruit we have not found any one who can place it, but all unite in saying it is good to best. The tree is a very strong thrifty grower. When young it is one of the hardest trees to grow in the nursery row, it has to be staked carefully to prevent growing in a spiral form; but when properly trained it makes a very handsome tree; the leaf is the largest we have ever seen on any plum, rough and strong and thick; tree hardy and a good bearer; fruit is of a dark purple in colour and in form like a snow apple, almost round, with a depressed line down one side from the stem; stem medium in length, strong and well attached; quality good to best. It attracted considerable attention at the Industrial Exhibition two years ago from its large size and fine appearance. The wood is fine and glossy in appearance, the buds strong and large. Messrs. George Leslie and Son who are propagating largely of this variety, find it difficult to train on account of its crooked

tendency. There is no better shipping plum than this on the list, even when quite ripe the flesh is so firm that it will bear shipping well to a considerable distance ; season from the middle to the end of September.

PEARS.

Flemish Beauty is a favourite in the colder sections of the Province, where our reports say it has proved quite hardy. In the Toronto section it is almost worthless, the fruit spots badly and cracks before maturing. More or less of this is also complained of from other sections, but not to the same extent as at Toronto. The tree it seems is very subject to blight.

Clapp's Favourite is spoken very highly of by all our correspondents ; from the north and east we are told that it is hardy and a good bearer, and from south and west we hear a great deal about its handsome appearance. The only objection taken to it is the fact that it has to be used at once when ripe, as it won't keep even a day beyond that point.

Goodale is only spoken of by eight growers, all of whom speak well of it.

Beurre de l'Assomption is said to be too tender to be of value for general cultivation over the Province ; it succeeds fair to well in the Niagara district, Huron, and along the Erie shores.

General Todleben.—A native of Belgium ; tree said to be hardy and a good grower ; fruit large and pyramidal in form ; stem nearly three inches long ; high, fine flavour ; season November, and can be kept up to the New Year.

Toronto Belle.—Originated in the nursery of Messrs. Leslie & Son, of Toronto ; supposed to be a chance seedling. The tree is hardy, short-jointed and not a rapid grower ; so far it has not shewn any symptoms of blight. Very productive ; fruit large to very large, almost a *fac-simile* in appearance of *Beurre Bosc*, but it is at least two months later ; flesh white when ripe, with slight crispness, melting, sweet ; quality best. The fruit can be kept up to the New Year. From specimens exhibited the past two years, we think this one of our best late pears, and should be in general cultivation.

The Messrs. Leslie have also a winter seedling that keeps well till spring ; quality for table medium, but cannot be excelled for cooking ; size medium to large ; tree rapid grower and an abundant bearer.

Souvenir du Congrès.—A very fine large yellow pear ; it grows to perfection in the Niagara district, but is far too tender for general cultivation ; many report it killed to the ground around and to the east of Toronto, and in many other districts.

Doyenne du Comice.—A French pear ; season December ; has not been tested extensively yet ; tree said to be very liable to blight.

Mr. R. M. Wanzer, of Hamilton, has a fall seedling ; large to very large, ribbed, medium stem, russet about the eye, flesh crisp, sprightly, large grain. The form seems to vary greatly, some resembling *Lawrence* while others resemble *Beurre Diel*. The quality is fair ; evidently a good keeper and shipper.

Mr. P. C. Dempsey, of Albury, showed at the Provincial Exhibition last fall a small yellow fall seedling ; flavour resembling *Seckel* ; size and form resembling *Dearborn's* seedling. This is really an excellent fall pear, melting, juicy, rich, very good.

The same grower showed a winter seedling in size and form resembling *Lawrence* ; slightly blushed on cheek, straight medium sloping stem, large spreading eye ; strong aromatic flavour, very juicy, sprightly and crisp, very good or best. We would like to see this variety in more general cultivation.

Beurre d'Anjou is a favourite almost all over the Province. It is said to be very free from blight, one grower in Northumberland County says that there they have instances where it has escaped in orchards where it is surrounded by other varieties badly blighted.

A peculiarity comes from a Stratford grower, in the shape of a pear tree which has borne two crops the past season, the first cover came in the usual way, but afterwards the new wood bloomed and fruit set well and fully matured. We did not learn the variety, but presume it was the caper of a *Duchesse*.

APPLES.

Grimes' Golden is well spoken of as a dessert fruit. Flavour rich, spicy; flesh tender, but tree rather late and a shy bearer. In the vicinity of Trenton the tree is said to be a free grower, hardy and fruiting well, but that its fruit was the past two seasons destroyed by the codling moth, while other varieties were comparatively uninjured.

Wagner is gaining in favour over a large section of the Province. Tree very hardy; free grower and early, regular and abundant bearer; quality good; a fine shipping apple.

Mann.—A deep green hardy winter apple, dotted all over with white spots, medium size, flat, depressed eye, short stem. On a loaded tree the fruit varies very little in size; a long keeper and very fine shipper; tree hardy and thrifty. Grown pretty generally in sections of Huron County, where it is considered one of the best for export, averaging a better price than either Baldwin or Greening.

Pomme d'Or, as shown at the Provincial Exhibition last fall, was too wild in flavour to merit a place in a collection.

Fallawater Seedling, also at the Provincial, was no improvement on its very ordinary parent. Although large and doubtless a good shipper, it could not hold a demand in market with its inferior quality.

Mr. Beall, of Lindsay, showed at the Provincial last fall a small fall seedling, in some respects resembling Autumn Strawberry, but in the face of the already too long list of fall apples we could not find it a place.

Taylor Fish.—An English apple. Mr. Latouzel, of Cherrydale Farm, Huron County, showed us some very fine specimens the past season. The tree bears regularly large crops; fruit large, green in colour, with very slight cheek blush; in form it resembles King of Tomkins County; season middle to end of August; a very fine cooker.

Prenyea.—A native of Prince Edward County. Tree a good grower, a regular and good bearer; fruit medium size, round flattened; colour greenish yellow. Said to be one of the best October dessert apples in that section.

Hastings.—Originated in Hastings County. Tree a fine upright grower, productive; fruit medium size. Said to be one of the best of its season for table and market. High colour, oval shape, flesh very white, juicy.

Leslie Crab.—Originated by Messrs. Leslie and Son of the Toronto Nurseries, when ripe is cream colour with slightly blushed cheek; sweet and agreeable to eat; said to be the finest preserving crab of any, takes very little sugar, larger than Transcendent; tree hardy; a free grower and heavy bearer.

Baxter's Red.—A native of Brockville, a winter iron-clad; larger than Alexander, almost cylindrical in shape, eye slightly depressed, colour darkish red in the sun and light red over, covered with white dots; a fine shipping apple, good cooker; tree very hardy and considered valuable for the colder sections; tree very rapid grower, one of the finest looking among the nursery rows.

Tetofsky.—A Russian apple, one of the earliest, enormous bearer, the fruit often growing in large clusters; a good cooker and fair for table, rather under medium in size. Upon the whole we scarcely think it an improvement on our early sorts.

Grand Sultan.—Of Russian origin; tree a fine thrifty grower; foliage large dark green; very productive and a regular bearer; fruit medium size, form conical, colour greyish white, striped and splashed with red, looking almost like wax; ripens with Early Harvest and continues in season much longer; character good.

Cellini.—An English apple promising well; tree a good grower and enormous bearer; fruit large, form conical, colour greenish yellow, splashed with red; season October.

Ontario is reported from all parts as making a fine healthy growth, and they say in the colder sections that it appears quite hardy.

Coxe's Orange Pippin.—Tree a poor slender grower, but very productive; the fruit forming long clusters giving the appearance as of onions strung in ropes along the limbs; fruit nearly medium size, round, colour green, striped and splashed with red and cinnamon; russet similar to the Ribston; a fine table apple, season November and December.

Mr. W. W. Austin, of Oxford County, has a seedling winter russet about the average size of the American Golden Russet, but more conical, deep eye and small stem, one cheek

slightly blushed; in form it is as fine and even as if it passed through a turning lathe, its fine form would attract the eye of any fruit fancier; flesh greenish, mixed with a yellowish tinge; flavour sub-acid, crisp, juicy, fruity, pleasant. We would place it as best, considered among winter apples of its class. We believe it would bring as high, or possibly a higher price in Europe than the American Golden Russet.

The same grower has an oval-shaped fall apple, in colour resembling Black Detroit, colour runs through the flesh, making it resemble the flesh of a ripe water melon; flavour sweet, juicy and pleasant. But we could not recommend it for more general cultivation.

Cliff's Hawthornden.—A native of Prince Edward County, waxen colour, rather poor in flavour, and if we can judge fairly by specimens at the Provincial Exhibition last fall, we do not consider it desirable for extended cultivation.

Princess Louise.—So named a year or two ago by a committee of the Fruit Growers' Association. It is a seedling from Fameuse, originated by Mr. Charles Woolverton of Grimsby; in size it is medium; very smooth, conical form, flesh white like the parent, colour also similar; flesh appeared firmer than in the parent, and it is said to be a longer keeper. Our impression now is that this seedling is an improvement on the Snow, and should be brought into more general cultivation.

Wealthy.—Originated in Minnesota from crab seed; fruit large, nearly round; colour bright red on a yellow ground; flesh white with some red stains; tender, juicy and very good; tree free grower and very productive, very hardy; season November and December, but will keep into January. One of the most popular apples in some of the Western States.

Mr. Charles Arnold, of Paris, has two distinct varieties from seed of Northern Spy. No. 1 resembles the Spy closely in form, size and eye, colour green with a yellowish tinge on cheek; it is a sweet winter apple, juicy and pleasant, flesh resembling R. I. Greening. No. 2 is a Russet resembling Bourassa round the eye and in form, but resembles Wagener around the stem, size medium, colour about the stem deep red and blushing all through the russety part; flesh firm, and flavour acid and pleasant; season winter.

We think it a pity that fruit growers do not make known through the medium of the *Horticulturist* any new fruits they see, and report progress from year to year; besides being very interesting, it would advance the fruit growing interest greatly. Such a course would be a check upon parties who frequently bring some thing new before the public, and in order to sell it will speak in language too highly coloured. We refer to dealers. Let the growers then speak out and fairly criticize what comes under their notice, giving facts of growth, crop, and market value.

Signed on behalf of the Committee.

ALEX. McD. ALLAN,
Chairman.

MR. MORRIS.—I would like to ask Mr. Allen where he got his information with regard to the Pocklington.

MR. ALLEN.—The information with regard to that, as well as with regard to all other new fruits, I got by inquiry at the Toronto Exhibition, at the Provincial Exhibition, part of it from Americans I met there. In making up my report I based it on the opinions expressed in the majority of reports which I had received, which were not in every instance in accordance with my own views.

After some discussion, in the course of which Mr. Morris submitted a Report which he had prepared upon the same subject, Mr. Beall moved: "That the Report submitted by Mr. Allen be received and disposed of in the usual manner; and that the Report submitted by Mr. Morris, another member of the Committee on New Fruits, be also adopted and so disposed of."

The motion was seconded and carried.

MR. E. MORRIS' REPORT ON FRUIT.

STRAWBERRIES.

Duncan ("Perfect").—One of the best of newer sorts; fine large fruit, which ripens earliest of any on our grounds; quality second to none; has no superior for garden and home use. To obtain best results, plants should not be crowded and ground requires to be made rich.

Prouty ("Perfect").—This variety is but little known, and its good qualities not recognized as they should be. It is one of the handsomest of strawberries; in shape long and tapering; of excellent quality and very firm; of fine colour, which it retains for a long time; stands shipping equally well with the Wilson, and is almost as productive.

Crescent Seedling ("Not Perfect").—The strawberry for the million; stands the usual slip-shod culture better than any other variety; plant somewhat slender grower, but makes such a large quantity of runners that the ground is literally covered with plants; immense cropper, but berries are apt to be undersized unless ground is made very rich; fruit resembles Wilson somewhat in shape, but of lighter colour; not quite its equal in flavour.

Captain Jack ("Perfect").—Commences to ripen with the Crescent, and a little later than the Wilson, which latter it somewhat resembles in shape and size, but is of better flavour. Upon good strong soil it outstrips the Wilson in productiveness. When fully ripe the fruit separates from the hull, which is a great advantage when grown for family use.

Sharpless ("Perfect").—Remarkable for its foliage; leaves of immense size; wants plenty of room, otherwise will not give satisfactory results. The fruit is very large, inclined to be irregular in form; when fully ripened of fine colour; flavour very superior. It has, withal, its defects as a market berry. Its large size and weak stems cause the fruit to lie upon the ground. It is also too soft for shipping; would only recommend it for amateurs.

RASPBERRIES.

Cuthbert and Queen of the North.—Claimed by some growers to be one and the same. The only difference that I have been able to detect has been in the hardiness of the Queen as compared with the Cuthbert. Have also noticed this difference in other plantations. It may not, however, be real but only apparent. Its merits are: Strong, vigorous grower; fruit very large; flavour best; firm; shipping qualities equal to the Blackcaps. From one year's fruiting we judge it to be extremely productive. It has a tendency to throw up suckers which produce late fruit, thus prolonging the bearing season. This raspberry unites more points of excellence than any other of the many new and old varieties that I have tested.

Gregg.—Is to Blackcaps what Cuthbert is to the Reds, that is, best of them all. Canes of strong growth and as hardy as any; immensely productive; fruit being larger than the Mammoth Cluster, and ripening somewhat later.

Niagara.—From one examination of a small lot of this variety in bearing at Lockport, N.Y., I have formed a very high opinion of it. Although the patch did not receive the care and cultivation to give the best results in fruit, nevertheless the plants showed immense productiveness. Fruit of large size and ripening late. Would recommend this Society to make arrangements for having plants of this fruit distributed among the members for a more extensive trial.

BLACKBERRIES.

Taylor.—Fruit medium in size between Snyder and Kittatinny. On account of its extreme productiveness, hardiness and excellent quality it is worthy of a place in all fruit gardens.

CURRANTS.

Lee's Prolific.—A seedling of the Black Naples, but an improvement on its parent in size and productiveness.

Moore's Ruby.—A new red currant, the result of a cross between the Cherry and White Grape. In size not quite so large as the Cherry, but from the appearance of about one hundred bushes examined, I judge it to be four times as productive, and of milder flavour than any other red currant we know of. I therefore consider it a great acquisition.

GRAPES.

Pocklington.—This is emphatically the era of new grapes, and among the aspirants for the leading position in the white varieties none have taken so many honours at Horticultural Shows as this. While highly endorsed by many of the leading and disinterested horticulturists, such as Marshal P. Wilder, Thomas Meehan, etc., it has been much misrepresented by the owners of rival grapes with the object of lessening its popularity. It is a seedling of the Concord, having the strong growing qualities and hardness of its parent; of much superior quality, however, being very sweet and a good keeper. The bunch and berry are large, the former often weighing from one to one and one-half pounds, the latter being placed thickly on the bunch and of a fine golden colour, covered with thick bloom. It ripens about with the Concord, and this season was picked in good condition from the vines six weeks after it was pronounced ripe. I consider this grape a great acquisition—the best of its colour for both market and home use.

PEACHES.

Wager.—From the glowing accounts we had heard of this variety we took occasion to send a leading man from our establishment to inspect it. The orchard visited was planted nine years ago, commenced bearing the second year, and has borne a full crop every year since without a single break. While most other varieties in the same orchard have failed some seasons to produce a crop, the Wager has never. The fruit is yellow, with quite a distinct blush on the side next the sun; size about the same as Early Crawford; very thick meat and small pit, from which it parts with very great freedom.

PEARS.

President Drouard.—A late winter variety, of French origin, ripening from March to May; tree bears early; large and well-flavoured fruit. We draw attention to this, having watched its growth for the past six years. It has proved the healthiest and freest from blight of any variety we have yet seen, not even excepting the Duchesse. In fact, no blight has yet appeared on leaf or limb, which, taking into consideration the good qualities of the pear, and the fact of its ripening at a season when no other fine fruit is to be obtained, makes me believe that it will take a place amongst our leading varieties.

APPLES.

Many new varieties have been introduced the past few years, some of them only valuable from their extreme hardness, being especially adapted for northern sections. I will only, therefore, refer to two or three of them as being real acquisitions to the already large list for our moderate climate, and as leader I would mention the

Wealthy.—It has the character of the Fameuse—fully better in quality, of larger size and perfect in shape, with freedom from spots, which, in some sections, destroys the value of the Fameuse. It is also a rather better keeper.

Wallbridge.—A large, red-striped winter apple; and the

Stump.—Similar in appearance to Sherwood's Favourite, and ripening about the same season.

CANADIAN WILD FLOWERS.

MR. SAUNDERS.—If there is no one else who has anything to say in defence of the wild flowers of the country, I would like to say a word or two. With the opening of spring, we find in our woods the Liverworts or Hepaticas, which have been cultivated in

Europe for some time past. They have now got up some double forms of them there, which are very pretty. I find that by transplanting these from the woods into the garden they flower much more prettily than in their native haunts. I consider a patch of Hepaticas one of the prettiest we can have in the early spring in our gardens. They seem to thrive well in any position. Following them is the Bloodroot, the "*Sanguinaria Canadensis*," the flower of which is not large. It belongs to the Poppy family, and, as is the case with the other members of that family, the flower drops its petals very readily. It is a very pretty flower while it lasts, and the foliage is remarkably beautiful. There is another flower closely allied to it, the twin leaf, the *Jeffersonia diphylla*, which closely resembles the Bloodroot in the flower, the latter being white. It also drops its petals. The foliage is even more beautiful than that of the Bloodroot, the leaf being divided into two portions. It is a luxuriant grower, and very ornamental so far as the foliage is concerned. A little later on we have the native phlox. It is a very handsome flower, even grown in the wood, where it is under all the disadvantage of want of care and attention. It comes in at a time when we have very few flowers in the garden, and none of that particular colour. It lasts well; it is a very free bloomer; and it has a very pleasant perfume, though not a strong one. In the liliaceous class we have a flower, which I think ought to be introduced in gardens. I have seen it in European catalogues. It is the dogtooth violet, a pretty lily-like flower with a handsome mottled leaf, which grows out of the ground early in the spring, and the flower also blooms very early in the season. The blossom is elegant in its form of a drooping head, and is very pretty indeed. There is another plant that comes later in the season, which, it strikes me, is well worthy of cultivation; it is the black "cohosh." It is a showy plant, with tall spikes of small whitish flowers which have a very nice appearance in the shrubbery. Then we have the lobelias. They are very extensively grown in Europe, and to some extent in this country, but they have not been much introduced among our people. The *cardinalis* will thrive in almost any good garden soil. In its native haunts it is found in swamps. The flowers are most brilliant in colour, and their season lasts quite a good while. The *lobelia Kalmii* also grows well in gardens.

MR. ARNOLD.—I have had a lobelia growing for years in my grounds, at the wall, and it succeeds splendidly. I was pleased to hear Mr. Saunders speak of the Hepaticas. I would like to suggest—to move if necessary—that Mr. Saunders be requested to cross these different plants, and in two or three years present a plant to each member of this Association. If he would do this, we would have a very great variety. One wild flower which he did not mention is the harebell. You will see it growing wild, sometimes after the winter's snow begins to fall. I have sometimes had a peculiar notion that I would like somebody to plant one of these flowers over my grave when I am dead. I think there is a silent music in it that is really delightful. If this flower could be crossed it would be a great acquisition to our gardens. We seem to be indebted to Europeans for taking our wild flowers, improving them, and sending them back; and what they send back are often not as well suited to our climate as what we might grow.

MR. SAUNDERS.—I am glad that Mr Arnold mentioned that little campanula; it is one I had forgotten. I have cultivated that little harebell for two or three years, and it is one of the most satisfactory wild flowers I have ever grown. It flowers during the season. No one who has not cultivated the common blue violet can imagine what a profusion of flowers it gives under cultivation, from seeing it in its haunts. In fact, it is a mass of blue for several weeks early in the season. I think it might be added to the list of flowers that might be cultivated.

MR. BEADLE.—Why does not Mr. Saunders mention the yarrows?

MR. SAUNDERS.—The reason I do not mention them is, that they are such shy bloomers that I did not think them worth mentioning in this connection.

CHIEF JOHNSTON.—There is a blue flower with a sort of bell that hangs over—I do not know the name of it—that I cultivate in my garden.

MR. BEADLE.—I would ask Mr. Saunders if he has ever found the *Epigea repens* growing?

MR. SAUNDERS.—No. I found it growing wild in New Jersey once or twice, and sent plants home and tried to cultivate it, but did not succeed. It seems to require a

mass of partially decayed leaves to grow in. I had a quantity sent me from Halifax the year before last, and I planted them, but did not succeed any better with them.

MR. BEADLE.—I believe that is the fate of that plant. It is certainly one of the most beautiful of all the spring flowering plants that I have ever seen, but no effort at growing it of which I have heard, and I have kept track of the experiments, has yet succeeded. It is often in bloom under the snow in the spring. It does not last long, but during the early spring you will find it in those shady nooks where it grows wild.

MR. SAUNDERS.—The kalmia is one of the finest flowers we have in our native wilds. I have grown it to a certain extent. The flowers are charming—clusters of the most beautiful red blossoms that you could find, beautifully formed.

MOST PROFITABLE VARIETIES OF POTATOES.

MR. ARNOLD.—My list would be Brownell's Superior, Dempsey, Rose Climax, Ruby and Eureka. Potatoes are a thing that may be a great success one year and a total failure the next. One soil may be suitable to one sort and not at all suitable to another. A few years ago I got some new potatoes that had been very highly praised, and I determined after two or three years to throw them away; but having none other to plant on one occasion, I planted some of these again, and after the three years' failure they proved the best potatoes I ever grew. No potato scarcely ever continues a favourite for more than four or five years at the outside. The old Climax is, I believe, admitted by everybody to be the finest table potato; and this Rose Climax is a sport from the old white Climax, a red one. It has its faults. Although the earliest of all potatoes, it never yields a crop or half a crop with me. I grew the Beauty of Hebron and St. Patrick this last year, but only one year's experience does not amount to much.

THE PRESIDENT.—I do not usually grow five varieties of potatoes. Unless a potato comes to a certain standard I never plant it the second time. In our collection at home this year, we simply cultivated a few Early Rose—a very few, too. My own potato, the Burbank Seedling, and a few Early Rose—those are our varieties of potatoes.

MR. PAGE.—I think if I chose five they would be the Alpha, Beauty of Hebron, Snowflake, White Peachblow and the new "Bet Treble." The Alpha is not a heavy cropper. It must have just the right kind of soil and culture, and then, I believe, it would be as profitable a potato as could be made. It is a good potato from the time it is large enough to use; it is not like our Rose potato, which is soft and wet until it is ripe; but the Alpha can be cooked and used from the time it is large enough to dig.

MR. JARVIS.—I would put all my five varieties in one—that would be the Early Rose. I have tried the Alpha, the Bet and the Snowflake, and I always come back to the Early Rose. So far, I have not planted any other excepting the few we are getting from the Association, to try them alongside the Rose. I have tried all the others, and have come back to the Rose.

MR. BEADLE moves for certain Committees, which were appointed as follows:—

On Fruit Packages—Messrs. Dempsey, Pettit and Smith.

New Fruits—Messrs. Allan, Holton, Arnold and Smith.

Vegetables—Messrs. Page, Croil and Taylor.

Ornamental Trees and Shrubs—Messrs. Leslie and Arnold.

Roses—Messrs. Beall, Dempsey and Beadle.

Hardy Flowering Plants—Messrs. Gilchrist, Forsyth and Bruce.

Climbers—Messrs. Wellington, Arnold and Saunders.

MR. A. M. SMITH.—I think, for the guidance of this Committee on the package question, it would be well to take an expression of the opinion of this meeting regarding what size they would consider best for the apple barrel, as that is the most important package to be dealt with.

MR. SAUNDERS.—I think any person buying apples by the barrel would prefer the big barrels. Any attempt to cut the size of the barrel down would not meet with my

personal approval; and I think the sympathies of the meeting would be in favour of the large barrel.

MR. BEADLE.—It seems to me that there is no need of any expression of opinion about it. I do not think we care one snap what the size of the barrel is; all we want is to have some size settled on, so that we shall know what is the size of a barrel of apples. All we want is to get something definite.

MR. WELLINGTON.—As I understand it, this Committee is to confer with Committees of the New York Horticultural Society and the Michigan Society, and certainly I think three Committees can decide on a size that will be acceptable to the three countries.

P E A S.

The meeting then took into consideration the question as to the five best varieties of table peas.

MR. ARNOLD.—If there is anything that I detest in connection with this Association it is any attempt at free advertising; and after saying that, I am going to begin and praise a new pea I have raised, that is superior to anything else I have ever grown. I have no pea of any kind to sell—no interest of that kind whatever. In selecting five varieties of garden peas it will be advisable to have them follow each other in season of ripening, and, in my opinion, the earliest and best of all peas grown on this continent is Bliss' American Wonder. This variety is a cross between those two grand peas so well known to most lovers of good garden peas, viz., McLean's Little Gem and that tall-growing, late, but delicious and productive old pea, Champion of England. The Wonder is very early and dwarfish, and very good. Second in season of ripening is the Alpha. This is a very good early pea, but it is a tall grower and requires sticking; this, in my opinion, is a great objection. Third, McLean's Little Gem, a very delicious, dwarf-growing, productive pea. Fourth, Hayes' Dwarf Mammoth. This pea grows about two feet high, and if planted at the same time as American Wonder would ripen about three weeks later. It is a very large, delicious and productive pea. Fifth, that grand old pea, Champion of England. If it were not for its rank growth and its sometimes being liable to mildew, in very hot weather, it would have no superior in its season. It ripens about the same time as Hayes' Dwarf Mammoth. On good rich soil and sticks, it generally bears good crops.

MR. SAUNDERS.—I would like to say a word in praise of this pea of Mr Arnold's. He was kind enough two years ago to give me a little of the seed, and I think it the most delicious pea I ever ate. Unfortunately, the pea bugs were so abundant that we ate them with the peas at first, I suppose, and they afterwards ate all the seed we had left.

MR. JARVIS.—With regard to the difference between dwarfs and standard peas, during my short experience of thirty years' gardening and planting, I have never had any success with dwarf peas; there has always come a storm which beat them down and destroyed them. I have given up the dwarf pea altogether. I have not heard of Mr. Arnold's hybrid before. I have always gone in for Daniel O'Rourke, Bryce's Little Conqueror, the Gem, and the Champion of England. I find if you give the Champion of England plenty of room and good long stakes you have a good crop every year. The Little Gem I have always staked the same as I have done with the little Dwarfs, and I have had, I think, the finest crop of peas of anybody in our little village. I attribute that altogether to the fact of staking them and keeping them up off the ground.

MR. CROIL.—We are troubled with the blackbirds. I used to sow a good many Dwarf peas, but the year before last they did not live, so this last summer I did not sow any till quite late, and the blackbirds left us and we had a good crop.

MR. BEALL.—I was favoured two or three years ago, through the kindness of Mr. Arnold, with a few of these peas he speaks of. They did not stool out but very little with me. They only grew about a foot high, and stood perfectly upright without stakes till they were fully grown. They are a delicious pea; and they are earlier than any pea I have seen. If you want to save them for seed you can do it without any trouble, because they all ripen at once.

GENERAL DISCUSSION.

It was here agreed that a certain time should be devoted to general discussion.

MR. ORR.—There is a prospect of peaches failing with us; the yellows are spreading rapidly in almost every orchard; and we are cultivating grapes more in that neighbourhood. I propose setting out half an acre of strawberries in the spring, and I want some information as to the best varieties to set out.

MR. BEADLE.—I know but one strawberry that is worth growing for market, and that is the Wilson. I have tried a great many varieties, and I know of none better. I have not tried the new varieties long enough to speak about them confidently. They may be all that those who champion them think they are, and it may possibly be that they are going to drive the Wilson and every other strawberry out of sight. I remember a great many years ago, when the Wilson was brought into notice, nobody said a great deal about it; if anything was said about it, it was generally run down at fruit-growers' meetings—it was too sour; it was too dark coloured; it was too this and too that. But everybody planted the Wilson; and if you will look over the Fruit-Growers' reports, or rather the American Pomological Association's reports, and take the Wilson's history, and follow it down from year to year, you will see that it has gone from New York State to every State in the Union. It is planted by everybody for market; and anybody who has made any money out of strawberries says he has made it out of the Wilson. It is not my business to plant strawberries for market; I plant them to see what kind of berries they are, and to eat them. I form an opinion after hearing what others say, and after seeing the berries myself, and I have just come to the conclusion that, after all that is said and done, we cannot say that there is a strawberry yet cultivated for our markets that will pay any more money back to the raiser than the Wilson. I am told that in the neighbourhood of New York and Philadelphia they get a higher price for other strawberries. I suppose they do; but the question is, do they get enough berries to make them any more valuable to them, after all, than the Wilson? That I very much doubt. I would plant some of these other new varieties—a few of them—and watch them, and see whether there was any probability of my doing any better; I do not expect that I would, though. As to the quality of the Wilson, or the quality of any of these strawberries, that is a mere matter of taste, because to like one berry more than another does not alter its commercial value. The great thing is, what will the public buy? The Wilsons sell, and they sell at a sufficient price, I suppose, to pay the raisers, or else they would not grow them.

THE PRESIDENT.—We have grown the Wilson almost to the exclusion of everything else for marketing, and I can fully endorse the sentiments expressed by our Secretary with respect to it. The berry that comes the highest to the Wilson is, I think, Crescent Seedling. In the basket I think it looks superior to the Wilson, on account of its being so uniform in size and shape; and in flavour it is fully equal to the Wilson. The berry is a little softer than the Wilson. I do not know what effect that may have on it in other years; but this year it shipped very nicely to Montreal, and arrived in very good order. We shipped it at the same time with the Wilson; they were picked the same time too; and they commanded the same price in the Montreal market. But this berry may turn out something like the Colonel Cheeny. A few years ago almost everybody was planting the Colonel Cheeny in our part of the country. I had not gone very far into the cultivation of the Colonel Cheeny. I had a little suspicion of it on account of its being a little soft. Some of my neighbours had excluded the Wilson, with the exception of a row or two, in favour of the Colonel Cheeny. There came on a rain storm sometimes near market time, and the berries, when picked, would perish during the night. I could cite you two or three instances of that kind. Parties have picked their stock of berries in the forenoon, and before they could dispose of them in the afternoon they were rotten on their hands. How far this soft peculiarity will extend I don't know; but certainly from one year's experience of the Crescent I think very favourably of it. We robbed it of plants in the spring to extend it. We did not clip any runners as it was growing, but in the spring took up all the runners we could spare, and consequently they

were not mulched, while the Wilsons growing just by the side of them were all mulched. This Captain Jack—spoken of, I think, in Mr. Morris's report—is a very fine berry, though when I thought it was going to produce three or four times as much as the Crescent Seedling, there were only about one-fourth of the berries that matured; they fall more or less immediately after they form. Nevertheless, it carried a crop of very fine fruit. There are some of Arnold's Seedlings that certainly are very fine and promising; but on account of not having a sufficient amount of skilled labour we lost the labels off them, and got the plants mixed up, so that I could not tell one variety from another. Some of them, however, were superior to anything I had on my premises. I have that Raspberry which has been called treacherous; it does not succeed with me.

MR. ARNOLD.—I do not feel as free to speak on the strawberry as I do to speak on the pea. All I have to say is, that those of mine are seedlings selected from several thousand seedlings; and if I did not consider them good I would not offer them for sale. The very finest strawberries would never be good market berries; only such coarse ones as the Wilson would be good market berries. The Alpha, which is the earliest I have grown, will be the best market berry, and there will be more money in it for those growing for market than any other, because of its earliness. There is one berry which Downing suggests I should call Arnold's pride. It is a very fine berry, much earlier than any of the rest of them. In fact, I believe the four are good; but they will have to be tested before their good or bad qualities can be spoken of.

MR. WOODWARD.—We only grow strawberries in a limited way around Lockport. They are mostly grown for Lockport and Buffalo markets; and the great market strawberry there is the Wilson. I do not grow them on my own place for domestic use; but I know about what are being raised by the growers, and I think the Cumberland Triumph is a very good market berry. I think it pays better than the Wilson. I have heard one or two growers there speaking quite highly of Miner's Prolific. I see that in New Jersey that berry, although not new, is coming into favour. Almost every strawberry grower I heard talking about the matter spoke very highly of Miner's Prolific; they seemed to think it was a very fine market berry, and that it bears as good a crop as the Wilson, or rather larger; that the berries are better, and the quality better. I find that in 99 cases in 100, people after trying new berries come back to the Wilson.

MR. BEALL.—When I speak of strawberries, I have to speak of those that I am intimately acquainted with at home, and my impression is, that there is nothing so good, taking it altogether, as the Wilson's Albany. I think that not only because it is, in my opinion, excellent in flavour, but because of its great productiveness and its unusually excellent appearance in the market. I do not like to say much about it, because we have no means of comparing it with others here before a large number of fruit men, otherwise I would exhibit some from Lindsay. At Lindsay there is often a large quantity brought in from Oakville; but our Lindsay fruit will always sell for fifty per cent. more than it. Our soil there will produce an enormous crop of the most excellent sample; and I am told that as far back as Haliburton, 70 miles north, they can beat us altogether.

MR. WOODWARD.—A year ago this last June I was at Cleveland at the time of the Fruit-Growers' Convention up there, and I found that the Triumph de Gand and the Cumberland Triumph had entirely supplanted the Wilson in that locality. What few Wilsons were coming into the market were selling at from three to four cents a quart, while the other varieties were selling at from seven to nine cents a quart. They were buying berries in large quantities to ship away; and the Wilsons were a drug in the street.

MR. ORR.—The mountain is on the rear of our place, and consequently we have a great many birds. The robins are very destructive. They destroyed nearly all my crop of Delaware grapes—not that they took all the berries, but they spoiled every bunch. We might shoot at the robins, but they would just fly from one post to another and escape us. I want to know if any of the other fruit-growers kill the robins in the spring?

MR. SAUNDERS.—It is contrary to law.

MR. ORR.—Perhaps a greater difficulty is owing to the honey bee. They destroyed a very great deal of my grapes, particularly the Concord. That matter has been brought in question over in the States. There have been lawsuits over it there; and I understand

the plaintiffs have been successful in getting damages. My neighbours on one side have about seven swarms of bees, and my neighbours on the other side have sixty or seventy swarms. They injure the peaches very badly also. This difficulty is very hard to overcome; but the birds, I think, we ought to be able to do something with.

MR. SAUNDERS.—The subject of the robin has been brought very prominently before the Commissioner of Agriculture in connection with the sittings of the Agricultural Commission, and the evidence has been almost invariably against the protection of the robin—that is, that he ought to be left to his fate. It seems to me that the law ought to be modified so as to leave it open to parties who are invaded by a host of depredators of that sort, to inflict summary punishment on them if they think it is necessary in their interests. I think if this Association were to give an opinion in that direction, it would have some weight in getting the law modified, so as to leave the matter in regard to the killing of the robin, and perhaps the cherry bird and some other birds, an open question, so as to take the protecting arm of the law away from them, and give the fruit-grower a chance of defending his own interest without being liable to be hauled up and fined for it.

MR. JARVIS.—A difficulty presents itself there again—that is, with regard to Sundays. Last year a friend of mine had a tree loaded with those magnificent English cherries, and I came down very early on Sunday morning to get some of them. I got there about seven o'clock, and the birds had come in about four, and had actually stripped that tree. Underneath the tree it looked as if they had been a week at it, and every cherry was gone. The birds were robins.

MR. HASKINS.—I have lately read in an American periodical, that over there, at a place where they raise a great many grapes, they have been obliged to cover the bunches with paper bags; it seems to be quite an undertaking to do that; but it seems at the same time to be the only way to save your grapes from the robins.

MR. SAUNDERS.—I have read something about that too. It is said that the grapes loose nothing in flavour.

MR. HASKINS.—There is a hole made in the bottom of the bags so that the rain will go through. We have suffered greatly from robins; we have lost tons of grapes.

MR. WOODWARD.—When I was a little fellow I learned about the robins covering up the babes in the wood, and I have always had sympathy with them since. We, too, have a law that protects the birds; but when they come in flocks we just become a law to ourselves. I do not like to report bad stories about the Yankees; but I guess some of them shoot birds on Sundays. I have seen not less than a thousand robins—and I guess you could multiply that easily by ten—on a vineyard of five acres; and then the robin is not half as bad as some other birds. The Baltimore Oriole is worse than any of them; and I tell you there is no other way but to fight them. A gentleman next to my place shot away last summer at least half a ton of No. 5 shot at them. He said that on one Sunday the birds destroyed more than two tons of grapes for him. In one gentleman's vineyard over there two men were employed continuously shooting birds. Mr. Thomas, whom you all know, said he said a good deal on behalf of birds, but if the fruit-growers would forgive him he would take back all he had said in their favour, and now say "shoot all you can." In regard to birds, it is a good deal the same in the vineyards as it is in the strawberry plantations. If you have half an acre of vineyard you will have birds enough to look after, and if you have 100 acres of vineyard you will have enough birds to look after it. The oriole won't take a grape and be gone with it as the robin will, but it will stick its little bill in the grape, and that is all it wants of it. I have watched bees very closely, and I doubt whether they will first attack a grape. I know that if the grape is punctured they are very glad to be on hand and take the juice; and that is fully as good as to let it stay there after it is punctured. From its structure I doubt very much whether the bee has anything—at one end of it, at any rate, with which it can puncture a grape—at the other end, I know from experience, it has.

MR. BEADLE.—I have been told that our American bees cannot puncture a grape, but that the Italian bees can.

MR. DEMPSEY.—There are some bees that I do not know very much about—the Holy Land bees. I do not know what they may do, but I am sorry to believe that bees puncture grapes. If they do I have yet to see it, and I have watched them very closely

too. I am not willing to assert, however, that they will not do it; it is possible that they may. I have seen varieties of grapes that crack easily, and I have seen bees working on them. I have also seen birds—that is, orioles and cherry birds—puncturing them. I have watched them very closely, and I have noticed that they will poke their beak in and then open out their mouth when it is in the grape, and thus make a hole as big as the skin of the grape will allow. In doing this they suck out some of the juice from the inside, and afterwards I have seen the bees sucking at it. These birds will also go at the pear, and I have even seen them working in apples. I am not willing to admit that our bees, and I think I can speak from good grounds, do any damage to our fruits. My garden where I live is not very large—there are fifty or a hundred grape vines growing in it—and there are usually several colonies of bees in it; and if they were inclined to destroy the grapes I should certainly expect to get a very small share of them. But as to the birds, I found this last year that there was only one way to save our grapes from their ravages, and that was to send a boy in to shoot them. I do not know that I shot any of them myself, but I furnished the ammunition.

MR. BEADLE.—I think perhaps an expression of opinion from this Association with regard to this matter of protecting these birds by law might be well. It is an unpleasant thing for a man, when he has made up his mind that he must in self-defence take the gun and go in and shoot the birds, to feel that he is liable to be brought up before a Magistrate and fined because he is breaking the law of the land. I suggest that we express our opinion in the matter; and it may be well to follow it up by appointing a committee to call the attention of the Legislature to the subject. I move “That, in the opinion of this Association, it is desirable that the law protecting birds be so modified as to permit fruit growers to shoot such birds as the robin and cherry bird when their grapes are invaded by them.”

The motion was seconded by Mr. Orr and carried.

MR. PETTIT.—I have suffered very much from the birds, and I find that sending small boys up and down among the rows of grapes clapping the bottoms of baskets together, drives them away about as well as if they were shot. If you attempted to shoot them you could only kill a few birds.

MR. HASKINS was requested to address the meeting on the grape vine leaf gall. He said: I have had only very little experience of it. I have only seen it on the Clinton grape. I remarked that in our vineyard it commenced on the east side of the field and went out on the west side. We did not have it last year at all. I do not know whether it is the same insect they complain of in France or not.

MR. SAUNDERS.—The gall is one form of the phylloxera. There are two forms, one of which attacks the leaf, and one the root. There has been no proof, I think, forthcoming that the insects which we have on the leaves in this country have ever attacked the roots. I had it myself last year on the leaves of nearly all my thin-growing grape foliage, but this year I haven't it at all. I have seen it on other grapes, but the thin-leaved ones are the only ones that suffered much from it.

MR. HASKINS.—We have perhaps over twenty varieties in our vineyard.

MR. PETTIT.—It made its appearance first with me last year on the Clintons, and also on the Delawares and on the Concords. They were quite thick on the Clintons.

MR. ORR.—I had them on the Concord, on the Delaware, and on wild grapes that I was growing on the mountain, quite bad.

MR. SAUNDERS.—I have not examined the roots to see whether it has attacked them. It is my practice to leave the roots of plants alone which are doing well. I have seen no indications that those that have suffered in the leaf are now suffering at the roots at all.

MR. JARVIS.—I have seen one of these dark grubs biting my leaves through, and if I had not picked it off it would have destroyed the vine. It is different from the grub you see on the honeysuckle. There is a long green grub that feeds on that. This is different; its head seems to stand up in ridges. It is prettily marked, and it grows to be quite a size.

MR. SAUNDERS.—I think it is what we call the green grape-vine sphinx. It never comes in great numbers. If you cut into this green leaf gall you will find it more or less full of these small lice, young and old together. As far as practicable the affected leaves

should be picked off and destroyed ; but I suppose that would be entirely impossible where the vines were so badly affected as Mr. Pettit says his were.

The meeting adjourned at half-past five to seven o'clock.

Upon re-assembling,

MR. BEADLE said : Mr. President, How do you succeed with raspberries in Prince Edward ?

THE PRESIDENT.—Raspberries succeed well in Prince Edward County. They do not winter-kill much.

MR. BEADLE.—What varieties are hardy enough ?

THE PRESIDENT.—The Philadelphia for one. There is nothing that has given so much satisfaction with us as the Herstine. Not a particle of that has winter-killed, and that is not because it is covered with snow. You know the size that our Herstines grow, and they brought nice prices this year. We continued to pick Herstines for fully six weeks this last season. We had not an acre of them, but they averaged more quarts per acre than the Philadelphia. The Philadelphia is too soft to keep over night to take to market. The Clark is also too soft a berry.

MR. BEADLE.—The Philadelphia has a peculiar bloom on it which makes it appear mildewy a little, which is a serious objection to it. That is the difficulty with all the hybrids of the red berry with the black of Mr. Saunders'. His hybrid caps are filled with pulp very pleasant to eat ; but put them on a plate and offer them to a person who is not acquainted with them, and he will say, "What is the matter with those berries ? They are dirty, dingy, mildewy looking."

THE PRESIDENT.—Saunders' black caps make good jam. They are very fine. They only sell middling in our market.

MR. BEADLE.—That is the way it is in our market. Five cents will be about the average you can get for the black caps, and you will get easily eight, nine and ten for the others.

THE PRESIDENT.—Black caps would bring on an average six or seven cents with us this year, and the Herstines would go from twelve to twelve and a-half and thirteen. We had always more orders for them than we could fill. The Herstine is a red berry.

MR. BEADLE.—Have you tried the Franconia ?

THE PRESIDENT.—Yes, at home. I have not tried it where I am now ; it winter-killed when I tried it. I cannot grow a Baldwin apple at home yet, though it grows very nicely on this place. Brinckle's Orange stands our climate first-rate, and the Yellow Antwerp too.

MR. BEADLE.—They wont stand in our climate.

THE PRESIDENT.—I have had them four years, and I have not seen one inch of them frozen. There were some fruit-growers who came and saw the Herstines when they were fruiting this summer, and every one of them wanted a certain stock of plants, so that I had to limit them.

MR. BEADLE.—I saw the Gregg, the new Black Cap, fruiting at Morris' and at Lockport this summer. It is a little larger than the Mammoth Cluster, and it has a more meaty texture or feeling in your mouth. It is more like eating a piece of fruit. The seeds are less perceptible in your mouth. I fancy the seeds are either small or else their proportion to the pulp is decidedly less. They are later than the Mammoth Cluster. I value the Thornless, the Mammoth Cluster, and the Gregg, making a succession.

THE PRESIDENT.—The Thornless does not give us good satisfaction, but four or five miles from us some growers would not plant anything else.

MR. BEADLE.—Do you account for that by variation in soil ?

THE PRESIDENT.—Variation in soil and elevation of it. I furnished a lot of Herstines to be planted in another section only two miles away, but in a more frosty region. There is something in this that I cannot account for. It has often been the case that within two miles of us—in fact, one mile—I have known tomatoes to be killed three or four weeks before ours were hurt. Then, again, in the spring I have known parties to set out tomato plants a third time on account of frost within a mile or two of where I am growing fruit.

MR. BEADLE.—Have you tried the Clarke raspberry ?

The PRESIDENT.—Yes. That won't compare with the Herstine there at all. It is hardly enough.

MR. BEADLE.—The Clarke is Mr. Smith's favourite, you know. He calls it his best paying berry.

MR. ORR.—I am only a beginner in fruit-growing, and my experience is very slight. It is only within the last four years that I have made any move in that direction at all. My idea in going into it was that I would grow peaches altogether in order to make money out of them. At that time I had no idea there was such a thing as the yellows. I had it in contemplation to set out ten or twelve acres of peaches on a northern slope between the mountain and the lake, a location which I considered a very good one. I joined this Association, and the subject of the yellows was discussed here, and very much discouraged me; and instead of setting trees out by the thousand, I set only about 400 that year. The next year matters were worse, and I set out only about 100; and I have continued at that rate. Now I am completely discouraged. There were a number of orchards in our locality which were not affected until this last year. The yellows have not appeared in my orchard that I am aware of, and there are some old trees there; but I do not know of an orchard around but has them. In a number of orchards they made their appearance about August last for the first time. Some of my trees I set on sand, and some on very heavy red clay; but those who have experience in growing on the clay tell me they will be much longer-lived there. They also tell me that the quality of the fruit which is grown on the sand is the better. I have planted a great many varieties, principally, however, Early Crawford, Late Crawford, Barnard, Stump-the-World and Lemon Cling. I have High's Early. That is what was called the Early Canada. It is a splendid peach, and doing splendidly. The trees have been out two years. The second year I got twenty-four fine peaches off it. I have some Alexanders—at least I bought them for that, but I think they are not true to name. They did not mature until a week after those were ripe. A number of my neighbours had Alexanders in a few days before our early peaches. Pettit's July is early, but is not so early as High's Early, and not so fine a peach. High's Early is not altogether a free-stone, but very nearly so; it is not strictly a cling-stone.

MR. BEADLE.—I have got the impression that High's Early, or Early Canada, clings less than either the Alexander or Amsden's June.

MR. ORR.—I have set out some of the Early Rivers, but not fruited them. My Stump-the-World fruited, and I found the peach a splendid one. It sells splendidly. I think for canning it is about the prettiest fruit I ever saw put up. It is beautifully pure and clear.

MR. BEADLE.—The Salway is a late variety. Some little time ago I was talking to Mr. Gray, who lives near Lewiston. He had planted a large number of Salways, and fruited them for three or four years, and he said they paid him more money than any other peach he had. The reason of that is that they come in very late, when all the other peaches are out of the market, so that he has a monopoly of the peach market at that time. A year ago this last October we had an unusually late October, and our late fruits ripened up unusually well. Mr. Gray said he was a little afraid that, if we should have such seasons as we had a few years ago, the Salway would not ripen, yet he would like to plant a few of it. I think this fruit will ripen once in four or five years on the average with us, and that it will not be so profitable in the long run as it has been in the last two or three years. It is a free-stone. The Salway will come in after the Stump-the-World. It is a very late peach.

MR. ORR.—The Stump-the-World is very late with us, and so is the Lemon Cling. The Lemon Cling comes about the same time as the Stump.

MR. BEADLE.—Then perhaps the Salway is no later than the Stump. My impression was that it was later.

MR. WOODWARD.—It is nearly two weeks later. They very seldom ripen in Western New York. I had the pleasure of being at a gentleman's house last December—about the 11th or 12th—and for dessert at dinner we had some Salways in good order, and they tasted quite like summer. He told me that when he picked them he put them in peach

baskets and put them in his cellar, and every day or two he would go into his cellar and pick out those that were getting mellow and take them up to eat.

MR. BEADLE.—Would you plant the Salway largely at Lockport?

MR. WOODWARD.—No, sir; I think the risk would be too great.

MR. ORR.—I am told that the Stump-the-World and the Lemon Cling will not mature some seasons.

MR. BEADLE.—I know the Lemon Cling will not mature some years with me. I want to enquire of Mr. Orr about the pruning. Do you or your neighbours practise shortening in your peach trees to any extent?

MR. ORR.—I must remind you that my experience is very limited. I have done so with some of my trees—those that grow on the sand. Those that grow on the clay I have not found it necessary to do it to. Some of my neighbours do so too, and they consider it a decided advantage. If that is not done the trees are likely to be too heavily loaded. By heading them in they get a better sample, and they consider it better for the trees.

MR. BEADLE.—I was talking with Mr. Watt, of Niagara, and he tells me that he shortens in very severely. He says he would rather have a peck of good peaches than a bushel of poor ones, and he thinks that it is easier to shorten in than it is to thin out the peaches, and that there is a decided advantage in keeping the head of the tree more compact by shortening in. If I understood him rightly he does not confine the shortening in entirely to the cutting off of the last year's growth, but if he thinks the branch is getting too long, so that the weight of the fruit will bend it down, he goes back into the two years' old growth, and then he does not trouble himself so much about the smaller twigs in the last summer's growth. He thinks that the result of it is that his trees are much more healthy, and he almost believes he is going to keep clear of the yellows through his system of cultivation, keeping them in good heart and not allowing them to overbear. One thing he says he is perfectly satisfied of, and that is, that he gets a much better quality of fruit, and that he receives enough more for the baskets of fruit he gets, to more than compensate him for the difference there is in the number of baskets.

MR. ORR.—In forming the head so compactly, is there not a danger of there being a lessening in the colour on the fruit in consequence?

MR. BEADLE.—There may be an extreme to which a person can go in that direction.

MR. ORR.—Then, in cutting back the two-year-old limbs, where would he cut?

MR. BEADLE.—I think, from what he said, that he usually tried to cut off at the fork, and leave more the appearance of a limb taken off.

MR. HASKINS.—I would approve of cutting back for one reason, and that would be that the tree would not be so likely to break down afterwards. If you grow fruit on a limb that is a long way from the trunk, the weight will be very likely to break that branch off in the centre where it comes out from the tree.

MR. McNABB.—I want to ask Mr. Beadle if he ever sowed wood ashes around the trees?

MR. BEADLE.—I have not sowed wood ashes as a special fertilizer for the peach. I would put the ashes around the peach trees to keep the little peach-borer out. But I am satisfied on general grounds that wood ashes make an excellent fertilizer for almost all fruit trees—I think I might almost say all fruit trees. I find wood ashes make an excellent fertilizer for young trees in the nursery as well as in the orchard.

MR. JOHNSTON.—I grow a few trees, and I manure them with wood ashes.

MR. JARVIS.—I tried peaches last year and the year before with very good result. They did not winter-kill at all. There is a neighbour of mine there whose trees were in a year before mine, and he had a splendid crop. He had Amsden's Junes as big as your fist, and I had some good peaches on my trees too. If the trees are not completely killed this year from the tremendous frost and cold we have had, I shall be very much astonished. There is another tree that I have planted there and been successful with—that is the English Mulberry. I suppose about Hamilton here it would do very well. Up about Chatham they grow very well. My tree this year bore very nicely—fine large, black mulberries.

MR. BEADLE.—I have two trees. They have been bearing for some years, and I never could get any fruit off them; the birds ate it.

MR. JARVIS.—The birds did not eat off my trees ; I do not know what is the reason. The berries are very slightly acid. They are between a black raspberry and a cranberry in that respect. They have a cranberry flavour. This particular kind, the English Black, I think very nice-flavoured.

MR. BEADLE.—Mine is the Downing The flavour is very much like that of the English Black.

MR. JARVIS.—I have a seedling peach which was only in a year ago last spring. I found it growing in a neighbour's garden, and took it up very early, and last year it blossomed and fruited, and I took off just a peach-basket full this fall of very nice peaches—something like the Lemon Cling, only smaller. We put them all down in glass jars, and we are using them now, and they are very nice indeed.

MR. BEADLE.—Mr. Jarvis' remarks about the seedling peach have started again a train of thought that my mind has been prone to run in lately, and it is this, that people generally can extend the region of the peach very much by growing seedling trees from seed ripened as far north as we can get it. When certain peach trees ripen their peaches take and plant the seeds from those and raise seedling trees, and when they fruit preserve the best of them, and when they ripen plant the seeds from them in turn. This I say as the result of some observations that I have made at home on tender trees which my father imported. When he succeeded, with a great deal of care, in making them live until they fruited, I planted some of the seeds of those trees, and succeeded in getting a race of trees from them that I do not think suffer in our climate at all. The young trees came right along without any protection. These observations I have made on more than one variety of tree ; and I believe there is something in this idea. When I was a lad, my father brought home one day a lot of seedling peach trees that he had pulled up in some farmer's peach patch. This might have been in 1830. Amongst these trees was one variety of yellow-fleshed peach that was of very fine quality indeed, and we all liked it. I have a tree of that variety to-day in my grounds. After my father planted these trees there came a winter which killed the peach blossoms so badly that there were very few that year, and consequently very few peaches ; but this seedling variety blossomed and bore fruit—not so fully as in other years, but more fruit than any other variety. In fact, if I remember right, it was the only peach that bore that year. So if I were obliged to live in Stratford I would try and raise a class of peaches in that way, and see if I could not get a variety that would bear in that climate. I received from a gentleman at Collingwood a seedling peach that was very fine-looking indeed, and a peach of good quality. I would hardly call it "very" good ; I presume he would unless he is familiar with a large number of varieties of peaches such as we grow here. It had the taste of a late ripening seedling peach, but it was far better than the average of sour seedling peaches that we have here. When I say it had the taste of these seedling peaches I mean it was more acid than our ordinary class of peaches, such as the Crawfords and those we market ; but it was a good flavoured peach, and the size and appearance of it were very good. You could peel all the skin off the peach with your finger if you like, just as you could peel it off a boiled potato. That is a characteristic of many of our seedling peaches here, especially of those that ripen a little late. I believe that he has got a more hardy peach than our Early Crawfords, or Late Crawfords, or any of that class of peaches that we have here—a peach of good quality, but which possibly may be improved on by keeping on in that direction. I think this may be a starting point for a northern race of peaches. We know that our Iowa friends are importing from Northern China peaches and pears—that they believe are going to be hardy enough to stand their prairie climate. Now, how is it that Northern China has peaches and pears so much harder than ours ? I believe they have raised seedling after seedling there until they have got a race that has become acclimatized. I should like, if any gentlemen are disposed to make experiments in that direction, that they would do so and note the result.

MR. HASKINS.—Have you ever known the peach to be grafted as apple trees are, on small roots ?

MR. BEADLE.—No ; but I do not know why it should not be done.

MR. HASKINS.—Have you ever known grape vines to be propagated in that way ?

MR. BEADLE.—Yes ; that is one of the ways they propagated the Delaware for a while.

MR. HASKINS.—If you take up an old vine and cut up the roots into little bits, and if you have any new variety of grapes that you wish to propagate, just graft them in that way, and you will not lose one in a hundred.

MR. A. M. SMITH.—Some three or four years ago I had a gentleman staying with me who had spent some fifteen years at Tien Tsin, and I asked him a good deal about the fruits and the temperature, and it occurred to me that something could be done in the way of introducing the fruit of China here. I entered into a correspondence with a merchant there, sent him a supply of things, and was to get a supply of other things back; but I never got them. I learned from this gentleman that they had a small white grape there and two coloured varieties. He said they grew a variety of the date-palm there successfully in the same climate, and the dates they used as preserves. It occurred to me that if they could, by a process of acclimatization, get a date-palm to grow—and he said the thermometer sometimes went three and four degrees below zero there—it would be desirable for us to get those varieties of grape too.

MR. WOODWARD.—Last June I had the pleasure of a long conversation with Mr. Budd in regard to the importation of those fruit trees from those countries, and he thinks the grape vines of China and Japan, or at least some of them, are of the *Labruska* type, something that is entirely different to the suppositions of any of the scientific men. He said, so far as he had been able to inform himself, there was but one variety of grape there that it was worth while introducing into Iowa, and he thought he would have some of them sent over. He said most of the grapes there were inferior to ours—they were small, and he did not think they would please.

MR. JARVIS.—Don't you think they have these plants from China now at Washington?

MR. WOODWARD.—Some varieties of them they have.

MR. JARVIS.—There is no doubt the Chinese are far ahead of us in horticulture. You will find there in the streets of Canton maples, oaks, and all those trees grown as dwarfs in little pots. They grow them there on little boats.

MR. A. M. SMITH.—I think all the efforts that have been made hitherto in the direction of introducing new varieties from China have been in the way mostly of bringing them from the southern portion of China, and that for the reason that the botanists have been able to obtain greater numbers of varieties there for the persons they were working for. I do not think much has been done yet toward ascertaining what kinds of fruits Northern China has that could be cultivated in our climes. I do not think they have anything of the sort in Washington; they had not two years ago when I was there.

YELLOWS IN THE PEACH.

MR. PETTIT.—Four years ago there were some of my trees that showed some signs of the yellows. Two years ago, at fruiting time, there were about thirty of them, and I destroyed those. This year, at fruiting time, there were about two hundred, and in an orchard of about fifteen hundred I do not think there will be over two hundred sound trees left this year. We were told at first that it could be spread with the pruning knife. Early in May I took a tree that had the disease, removed a branch from it, and shaved the bark off it. I then took a healthy tree, shaved the bark off it, and rubbed the branch from the other tree and it together. I then marked this healthy tree, and I found the fruit on it this year was perfectly healthy. I also took a diseased branch while blossoming to a healthy tree and rubbed it on it, and the fruit of that tree was perfectly healthy too. I would put the Smock tree first for profit. I have made more money from Smock peaches than of any kind I grow, and I grow ten or twelve of the leading varieties on the same kind of soil as it. If I were planting again I would not run entirely into Early Crawford. I put out ten acres last spring, and put over one-third Smocks, and not a third Crawfords; and the proportion has generally been about two-thirds Crawfords. The Smock comes in some time after the Crawford; it is after the Late Crawford and after the Lemon Cling; it is the last peach except the Salway; it has always ripened up well with me, and has been a heavy bearer. It is a good high-growing tree. Three years ago the Smocks brought me 75 cents a basket more than the Crawfords. My orchard

is a little later than the Grimsby orchards in ripening, and when the Grimsby Smocks are gone mine are in prime, and I realize from 25 to 30 cents a basket more for them sometimes than they do. The Lemon Cling is later than the Salway. The Salway is not as good as the Late Crawford in quality, and not as good as the Smock quite, I think. There is very little difference between it and the Smock; it comes in a little later. We have had suits in courts of law about the Lemon Clings, on account of the Grimsby nurseries sending them out for Crawfords. That peach has been more profitable with me than the Crawfords, and has sold higher than they. The glut is over when it comes in, and it bears a very heavy crop.

MR. ORR.—In view of the yellows, would you still set out trees?

MR. PETTIT.—No, I would not; I would set grapes.

MR. WOODWARD.—If I should give you any advice about the peach, I should be sure and advise you to do something I have not done. I am sorry to say that the yellows in the peach are a great deal worse difficulty than the robins in the grape, and the more I study it and investigate it and look after it, the less I know about it. We are pretty well satisfied that peach raising has got through paying with us for the present. In an orchard in which I had 3,500 trees, as fine as a man could wish to see, I do not suppose that to-day I have anywhere near 200 that are healthy; and I am going to take them out clean next spring, with the exception of a few trees of some chance variety which so far have proved to be healthy. I do not know what that variety is. They are later than the Crawfords by nearly a week perhaps. They begin to ripen about the time that the Crawford gets beyond its time. They are a little larger than the Crawford—more round, not quite so likely to be irregular—a little darker colour, a little richer peach, and a much more healthy-looking tree. We used to shorten in our trees and thin out. I had as fine an orchard as I ever saw, and took a great deal of pleasure in it. The first year the yellows attacked it, I had two or three trees affected. I did not call it the yellows; I supposed it was the effect of the hard winter. The next year I lost two or three hundred, and then I went and applied all the nostrums the books told about, and last spring, up till about the 1st of July, I thought I had got the start of the yellows—I never saw healthier-looking trees. I have heard people say that the disease was owing to the trees not being properly nourished. Well, my trees, planted five years ago last spring, some of them 18 inches in diameter, had been cut out and thinned out; and my idea of thinning out trees is to keep up about 15 inches of new growth each year. That is a great deal easier than to thin the fruit; but then of course I thin the fruit also. I had a very fine orchard, and I have seen a tree healthy with the exception that one peach on it was diseased, and the next year it would be gone. Another would have one limb only affected. Another tree would struggle along before the disease would spread. If we had not the yellows in our vicinity, and if I were going to plant a new orchard, knowing what I do now of peach growing, I would astonish the natives; I would plant it entirely with white varieties, and I would plant it entirely for drying. The white peaches are worth for drying at least 15 or 20 cents a bushel more than other peaches; they come out as white as paper. A man who dried white peaches sold them for, I think he said, 42 cents a pound, while yellow peaches were worth only 27 or 28 cents.

SUMMER MEETING.

The Summer Meeting of the Fruit Growers' Association of Ontario was held in the Town Hall, at Owen Sound, on Wednesday, the 24th day of August, 1881. The meeting was well attended. Owing to the severe frost which visited the place early in summer, the display of fruit was not so good as in former seasons, but much better than was expected.

PRESIDENT DEMPSEY having called the meeting to order, drew attention to the first subject on the programme for discussion, viz.: "To what Diseases and Insects are Plum Trees here liable?"

In answer to this question it was found that the depredations from insects were not

serious. The most destructive of these pests are tent caterpillars, but they are not so numerous but that they can be easily destroyed.

MR. R. TROTTER found that black-knot destroyed many trees, but might be got rid of by washing with copperas after the diseased part had been cut away.

MR. WM. BROWN said if black-knot were cut off twice a year and burned it would be found no serious trouble, and a good preventive of the spread of the disease.

MR. D. R. DOBIE said he had noticed a small puncture in the plum, and a dark brown track through the flesh of the plum, as if made by an insect.

MR. HILL thought black-knot was a very serious disease, and needed to be promptly amputated.

MR. T. ROBINSON said he found gum accumulated on the end of the plum, but had not found the insect he supposed to be the cause of it. He wondered whether black-knot affected all kinds of plums.

DR. CAMERON said the first symptoms of the disease appeared by the cracking of the bark, which gradually came away from the trunk and fell off; then the trunk itself began to rot, and finally died.

PRESIDENT DEMPSEY said curculio begins to sting the fruit immediately it is formed, causing it to drop.

MR. JOHN CHISHOLM said the number of insects was not sufficient as yet to be serious, but black-knot had shown itself to be more serious than any previous year, and he calculated to cut them sufficiently to remedy the evil, the shortest plan was to dig them entirely up.

MR. GIFFORD said he found that this year black-knot had affected the trees more than any previous year, and considered that cutting was insufficient to overcome the emergency—nothing less than the cutting down of whole trees would answer. So far he found it was chiefly confined to blue plums.

MR. R. J. DOYLE.—Many of the trees are propagated by suckers, and if a tree shows black-knot, suckers have no business to be taken from them, as it is sure to show itself on them also. He found black-knot had affected his wild cherries, and most trees that stood in wet soil. Under-draining and cutting off he found a simple remedy, if dealt them at an early stage.

MR. D. R. DOBIE said that black-knot was very bad among his trees this year, especially on Jefferson and McLaughlin trees.

MR. BROWN.—Black-knot was worse thirteen years ago in my garden than now. Then I cut away all the affected parts, and so in a great measure got rid of it, but this year it has shown itself worse than usual, yet I think amputation will keep it down.

MR. GIFFORD said he thought the hard winter weakened the pear trees and increased the blight, and in all probability had a great deal to do with the increase in black-knot this year.

MR. HILL said that plums worked on wild plums were less subject to black-knot; and he found suckers very subject to the disease.

MR. JOHN CHISHOLM said he had brought a sprout from Grimsby, and that for twelve years it never showed signs of black-knot. In Manitoulin Island the wild plums were entirely covered with it.

MR. W. A. STEVENS said he found that black-knot showed itself more this year than usual, especially with sprouts, and found amputation a simple and only remedy.

JUDGE MACPHERSON.—Some years ago I noticed signs of this troublesome disease on a tree, and had it cut out without damaging the tree to any considerable extent. Black-knot appeared on the beech, but in a different form to that on the plum.

MR. BUCKE.—In Ottawa neither curculio nor black-knot had shown themselves; where it did, he knew coal-tar spread over the wound after cutting would keep it down.

DR. CAMERON.—The cause of black-knot is altogether unknown. Many orchards have to be cut down on account of it.

MR. McD. ALLAN.—In curing black-knot first get rid of the suckers, then cut away the affected parts, and manure with salt. He thought black-knot was not so formidable as curculio, but as yet he had found no signs of it, he was happy to say.

MR. BEALL said he had not seen any cases of black-knot at Lindsay until this year,

but was sorry to say it had showed itself on the red cherry, but not on plums. He, however, knew a plum tree that had been affected for over thirteen years.

MR. YOUNG said he managed to keep black-knot under by amputation, and curculio by jarring.

PRESIDENT DEMPSEY.—In 1848 I saw black-knot on the cherry; two years after it appeared again, and this time killed the trees. Sprouts came up from some of them, and they bore fruit; even after a second and third attack he had known this take place. Black-knot appeared on a plum that he had obtained from Dr. Beadle grafted on a wild plum. His neighbour's plum-orchard was covered with it to such an extent that the trees had all to be cut down; sprouts grew, and became healthy, and finally bore fruit. He found plum-rot worse to cope with than curculio.

The next subject for discussion was the "Best Means of Resisting the Borer in Apple Trees."

Very little was said on this subject, as no one seemed to find it particularly troublesome, only one person having seen any signs of it among his trees.

GRAPES.

MR. BROWNLEE said he found the Eumelan succeed well, though the bunches were rather loose, yet they ripened well, and were not subject to mildew; they were ripe on the open trellis on the 15th of September. The Delaware also succeed well and ripen, and are not subject to mildew. The Concord hardly ripens some seasons, but succeeds well. Creveling ripens well, but the bunches are very loose. He grew the Brighton, Burnet, Champion, Clinton, Concord, Creveling, Delaware, Eumelan, Hartford Prolific, Moore's Early, Muscadine, Rogers' Nos. 2, 3, 4, 5, 9, 15, and 22. A coop of chickens would eat the thrips.

SMALL FRUITS.

DR. CAMERON.—I have grown Whitesmith's gooseberry, by cutting out the wood thoroughly, with very little mildew.

MR. CHISHOLM.—Brinckle's Orange raspberry does well here without protection. In July shorten the canes to strengthen them, so that they will stand up, but find no trouble in growing them. The English gooseberry I find mildews. Houghton succeeds well, as also do currants, except where they have been attacked by the saw fly. Black Naples, White Grape, Cherry, etc., all do well, but hellebore must be employed to keep the leaves from being destroyed by the saw fly.

MR. MILLER said he grew a great quantity of currants, but not many raspberries or strawberries.

MR. FROST said Downing gooseberries are my favourites, and bear well; they are hardy, but I am obliged to use hellebore. All small fruits do well, especially currants.

MR. DOYLE said he grew large quantities of strawberries, and went in especially for the Wilson.

MR. J. E. WHITE said Crescent Seedling strawberry brought him in an immense crop, and always did well. He preferred the Crescent to the Sharpless. Cuthbert raspberry promises well.

MR. MACLEAN.—Black currants grow well in our part, but do not bear well.

MR. TROTTER said he found currants do well, but was obliged to use hellebore. Raspberries also grow well, and Wilson's strawberry.

MR. ROBINSON said the late frost spoiled the crops this year. He found none so profitable for market as Wilsons; Sharpless are very promising; Col. Cheney is productive, but soft; Prouty handsome, but soft, poor on sandy soil; Sharpless must be grown in hills; Crescent will out-crop the Wilson; Glendale is valuable only for being late.

MR. BUCKE thinks highly of the New Dominion and Arnold's Pride.

JUDGE MACPHERSON thought highly of the New Dominion.

PRESIDENT DEMPSEY thinks very highly of Arnold's Pride and also of the Sharpless, which do best in clay loam; in the highly-manured gardens they do not bear well. Manures with ashes, bone-dust (half a ton of bone-dust to an acre), ten barrels of unleached hardwood ashes to an acre. Wilson's Strawberry gave 6,000 quarts to the acre.

MR. ROBINSON said Knevet's Giant was soft, but productive, good flavour, and large. Pride of Hudson is a splendid berry and rich flavour. The Victoria is very good. Franconia is the best among foreign raspberries. Cuthbert is prettier than Franconia, and bears a remarkably good crop, but is not so hardy; it is nearly as productive as the Philadelphia. Turner is very early, the best early; Cuthbert is best late. This year Turner showed signs of mildew, but has an excellent flavour. Gregg—this is a large black-cap—sold for ten cents a quart at wholesale.

MR. BEALL grows Whitesmith's gooseberry by forking up the soil in spring and covering it with a heavy coat of manure (rotted) and a quart of salt to each. Native spruce makes the best evergreen hedge. Japan Quince makes a beautiful hedge, both when in flower and later in leaf.

MR. ALLAN says osage suckers sometimes freeze. English blackthorn forms the best hedge; the Berberry also makes a good hedge; they are very handsome and very hardy. Norway spruce makes the best evergreen hedge.

After a vote of thanks to the friends at Owen Sound, the meeting broke up.

REPORT OF COMMITTEE ON FRUIT EXHIBITED AT THE SUMMER MEETING.

Owen Sound, 24th August, 1881.

Your Committee on Fruits, composed of Messrs. McLean, Young, McD. Allan, and Bucke, have much pleasure in submitting the following report on the fruits exhibited at the summer meeting to-day:

APPLES.

MR. SAUNDERS showed an apple grown in 1880—whether from long keeping or otherwise, though presenting a very pretty appearance—yellow dotted skin with a bright pink cheek—presented no special recommendation, and appeared to be a seedling.

MR. JOHN McLEAN exhibited a Golden Russet of last year's growth in fair condition; also the Northern Spy, Cooper's Market, Æsopus, Spitzenburg, and Greening, showing their long keeping qualities, but too ripe to have any flavour. His Early Harvest of this summer was much later in ripening than usual.

MR. WILLIAM BROWN placed on the table a Seedling Russet of 1880; it is an excellent keeper. The tree is now thirty years old: a heavy and constant bearer; and your Committee would recommend it for propagation and dissemination. Also a fair sample of the Sweet Bough.

MR. D. H. CREASOR handed in some fine Hawleys, and a fair specimen of Early Harvest: also a fine lot of Duchess of Oldenburg, but not so far advanced as those grown further south.

MR. BEATTY displayed some Red Astrachans.

PEARS.

MR. JOHN CHISHOLM exhibited the Beurre Diel and Louise Bonne de Jersey, both fair samples for the time of year.

MR. D. A. CREASOR, a plate of Bartletts, Clapp's Favourite, Seckle, all fine samples.

MR. RICHARD TROTTER showed a good sample of Early Harvest.

MR. J. McLEAN presented the Brandywine, of fair quality.

PLUMS.

MR. RICHARD TROTTER displayed the Washington, Bradshaw, and Nectarine, especially fine samples, with no trace of curculio.

MR. D. R. DOBIE had Jefferson and Washington; the latter were well-grown, fine plums; the former were good, but disfigured by russety marks, no doubt caused by the late spring frost of 10th June.

MR. D. A. CREASOR presented Coe's Golden Drop, Duane's Purple, Bradshaw, Washington, Green Gage, Pond's Seedling, all fine specimens, with the exception of the last, which was of inferior quality.

MR. WILLIAM BROWN—Green Gage, and some Seedlings, without any special merit; one of these, however, a yellow plum, comes true from seed, and might be found hardy in a colder climate.

MR. P. E. BUCKE, of Ottawa, showed some specimens of the Glass Seedling, grown on his grounds. The tree is very thrifty, and appears to be perfectly hardy; the specimens were unusually fine, and the tree, which was sent out by the Fruit-Growers' Association, is reported as being quite an acquisition to the Ottawa district.

MR. JOHN McLEAN placed on the table a Seedling blue plum of considerable merit; medium size; free-stone. Your Committee would recommend it for trial in other and colder localities, and if found to maintain its general good character, that it be taken hold of for general cultivation.

MR. J. CHISHOLM also exhibited a Seedling which we recommend for further trial over an extended area; it is a late blue plum, not so handsome as the previous one, but its qualities might make it as advantageous to grow and quite as profitable.

GRAPES.

MR. THOMAS BROWNLEE showed Delaware, and Rogers' Nos. 5 and 15; all were fair samples of their kind.

PEACHES.

MR. CREASOR had the Hale's Early, of medium quality.

(Signed)

P. E. BUCKE.
ALEX. MCD. ALLAN.
H. F. YOUNG.
JOHN McLEAN.

To the President of the Ontario Fruit-Growers' Association.

REPORT OF COMMITTEE APPOINTED TO EXAMINE THE SEEDLING FRUITS SHOWN AT THE PROVINCIAL EXHIBITION AT LONDON, 1881.

Your Committee, appointed by the Association to examine the Seedling Fruits exhibited, beg to submit the following Report:

PEARS.

A large winter Seedling Pear shown by Mr. Lutz, of Stony Creek, and which was referred to in our Report last year, was again brought before us. It is very attractive in appearance, and the specimens fully equal those shown last year. We believe this to be a promising fruit, and one that deserves to be more widely distributed, and hope that some steps will be taken to place it in the hands of fruit-growers in other sections of the country for more extended trial.

Further samples of a Seedling Fall Pear, raised by Mr. P. C. Dempsey, were shown, in which the fruit fully maintained the high quality spoken of last year. We regret that the size of this fruit is too small to admit of its ever becoming popular.

GRAPES.

Albino.—Claimed to be a cross between Allen's Hybrid and Concord. This new white grape, raised by Mr. Wm. Haskins, of Hamilton, and shown for the first time last year, was again on exhibition, and impressed your Committee very favourably. In size the

berry is about the average size of Concord; bunch a little smaller than Concord; fruit yellowish-green, with a nice bloom; fleshy, with a sweet melting pulp, and very pleasant flavour, and free from the flavour of the fox grape. Foliage about the same as Delaware. If this vine proves equally prolific, hardy and free from mildew in other localities, we believe it will take its place in the front rank among the new white grapes.

Yellow Concord.—A seedling of the same parentage as Albino, also raised by Mr. Haskins. This grape is a little larger in berry and bunch than Albino; bunches shouldered; colour of berry greenish-yellow, inclining to amber; flesh sweet, of a pleasant flavour; pulp not so tender as that of Albino. This is the first time this grape has been brought under our notice.

Abbyssinia.—This new black grape we reported on last year; it is also a seedling of Mr. Haskins'. As shown this year, the bunches are large; berries larger than average Concord; skin thin, and will bear chewing without any unpleasant after-taste; berry sweet, juicy and high-flavoured, with a tender pulp. We are glad to know that this grape is being tested in other localities, as we look upon it as one of the best grapes of recent introduction.

Pocklington.—This is a large and handsome-looking grape, large in bunch and berry; fruit greenish-yellow, inclining to amber when fully ripe; appears to ripen about with the Concord; flesh sweet, with a pulp which is moderately tender; skin thin, and will bear chewing without imparting more than a slight sense of acidity. As this variety is being largely disseminated throughout our Province, we shall soon be in a position to judge of its relative merits as to hardiness, productiveness, etc. In flavour and odour this grape reminds one of the native fox grape, a characteristic present in most of Rogers' Hybrids, and one which many do not object to.

Prentiss.—This is a Seedling white grape, shown by T. S. Hubbard of Fredonia, N.Y. Bunch a little below medium in size, but very compact; berries, indeed, somewhat crowded in the bunch. If we can judge from the bunches exhibited, attached to the wood on which they have grown, it must be very prolific. Berries greenish-yellow, nearly round; sweet, juicy and of a pleasant refreshing flavour, with a tender, almost melting, pulp; skin rather thick, and imparts a slight sense of acidity to the mouth when long chewed. Although not in our opinion as fine in quality as some of the other grapes here reported on, we believe that if the Prentiss proves hardy and ripens sufficiently early in our Province, it will commend itself to the public as a good dessert fruit, and one which we are of opinion would keep well and bear shipping to long distances. Some of the bunches now on exhibition are the same as were exhibited at the meeting of the American Pomological Society in Boston three weeks ago.

Niagara.—This handsome greenish-yellow grape, which has now been before us for two years, is again on exhibition. It is shown by the Niagara Grape Co., of Lockport, N.Y. This grape has not yet been fruited in any part of our Province, and as yet we have no knowledge as to its hardiness here. The bunch is above medium in size, and compact; the berry oval, with a nice bloom on its surface; in size about the same as Concord; flesh very sweet, with a tender, almost melting pulp, and a strong odour and flavour of the fox grape. As a market variety we think this grape promises to be a very popular one, if it should succeed as well throughout our Province as it appears to do with the present owners.

MR. REED, of Port Dalhousie, exhibits two Seedling white grapes under Nos. 1 and 2.

No. 2.—Is of a greenish-amber colour; bunch medium, slightly shouldered; berry medium in size, round, and covered with a nice bloom; flesh sweet, rich and nearly melting. We are favourably impressed with the quality of this fruit, and should be glad to see it tested in other parts of Ontario.

No. 1.—Fruit yellowish-green; bunch small; berry about the size of Delaware, round, very sweet and rich; skin thin.

MR. RICKETTS exhibits eleven varieties of his Seedlings.

Bacchus.—Is a new wine grape, about the size of Clinton in bunch and berry, but sweeter than Clinton, and with a pleasant, sprightly flavour.

Empire State.—Bunch large; berry medium; colour pale green; fruit juicy and watery, rather acid.

Excelsior.—Bunch large; berry medium; ripens unequally, like Diana; fruit juicy, sweet and sprightly, with a melting flesh, and pleasant musky flavour.

Lady Washington.—As exhibited this year, this variety is not equal in quality to those shown last year.

Irving.—Bunch large; berry above medium, round, greenish-yellow; sweet, with a pleasant, sprightly flavour and tender pulp.

Jefferson.—Bunch large; berry medium, of a pale red colour, round, sweet, with a tender, juicy flesh, and good flavour. This variety we esteem as the best among those exhibited by Mr Ricketts this year.

WM. SAUNDERS.

P. C. DEMPSEY.

D. W. BEADLE.

ORNAMENTAL PLANTING.

BY W. C. BARRY, ROCHESTER, N.Y.

It hardly comes within the scope of this paper to treat of the details of landscape gardening, but ornamental planting is so intimately associated with that subject that by way of preface I will refer to some of its leading principles and operations.

DRAINAGE.

One of the first and most important considerations connected with ornamental planting is thorough drainage of the soil. Few people are aware of the importance of this operation, and many gardens and grounds which have been planted at considerable expense, afford little or no satisfaction, in consequence of lack of attention to this important work. Planters should understand that trees and plants cannot thrive in undrained soil, unless it is naturally dry, which is rarely the case. There are many potent reasons for drainage, which, if properly considered, would induce planters to devote the necessary time and thought to the subject. I will refer to some of them briefly.

Experience has taught those who have planted extensively and observed closely, that all trees and plants thrive best in a dry, deep, porous soil. The roots of such trees strike deeper, the stems grow stronger, and the young wood ripens up perfectly before the cold season sets in. It is of the greatest consequence that the young growth should ripen well, for if it does not, a severe winter is certain to kill it back, as is the case generally, if not always, with trees and plants growing in undrained or wet land. Disappointed planters sometimes tell us that the trees and shrubs which they purchased, and which in our catalogues are represented to be perfectly hardy, have been winter-killed, and they ask us how we can account for it. An examination of the case most always shows that imperfect drainage is the cause. The hardiest trees and shrubs will not root well in wet soil, and though they may live for a while, they go sooner or later. Conifers and half hardy trees particularly cannot endure such treatment, and a dry summer or a severe winter quickly puts an end to their existence.

Deep drainage, while it carries off the superfluous moisture, so injurious in its results, has also the effect to render the soil warm, friable and porous, allowing it to be worked more thoroughly, and preventing injury from drouth. Cultivators have learned that well-drained, deeply-worked land, resists the drouth remarkably by absorbing all moisture in the air. Great losses are thus averted.

Many are deterred from drainage on account of the expense. Good tile drains, sunk three or four feet in the ground, and about twenty feet apart, with a good fall and proper outlet, can be made at a moderate expense. Even though the outlay seems quite considerable at first, it is nothing compared with the losses and disappointments which may result from undrained land. After draining, the soil should be well ploughed and stirred to the depth of eighteen inches, and properly enriched. If the drains work well, we may look forward to good results from the planting.

ERRORS IN PLANTING.

The effects of judicious ornamental planting are greatly enhanced if the grounds are well laid out. Inasmuch as I intend my remarks to apply more particularly to small or medium-sized gardens, I will refer briefly to some errors in planting which are usually made, and which mar the beauty of grounds.

I suppose that I cannot be much out of the way in stating that there are few people who know how to lay out a garden. This is not strange, because it is no easy task, and it requires knowledge, experience and skill. Many imagine that they are capable of laying out their own grounds, and only find out how little they know of the subject too late—after they have planned and planted with unsatisfactory results. The laying out and planting of grounds, whether they are large or small, should, if possible, be entrusted to competent artists. The expense will be small, and the satisfaction great.

In every city and village, gardens are to be seen which have been planned and planted utterly regardless of all rules of landscape gardening. Those who have a knowledge of the art cannot refrain from noticing the blunders that are made, and it is particularly annoying to them to see fine grounds, which might have been rendered exceedingly interesting, utterly ruined by injudicious planning and planting. The owners of such grounds, though they know nothing about gardening, feel that they have made grave errors, but that it is beyond their power to correct them.

In city gardens, one of the mistakes most frequently committed is that of planting indiscriminately—leaving no breadth of turf, and destroying the lawn without realizing any effects from the plantings. If we look about us we shall see how often this occurs; yet it seems very strange that gentlemen who have spent thousands upon a house, would be willing to sacrifice beautiful grounds by careless planting. The same attention and care which are bestowed upon the house should be devoted to the garden, in order that the house and its surroundings may present one harmonious whole. Another common error is that of planting trees which attain large size, in small lots. A tall elm or Norway spruce, or other large tree, is very much out of place on a small lawn. There is no excuse for errors of this kind, for there are numbers of trees of secondary size which can be employed with advantage. In the proper place I will name a selection of trees and plants suitable for the purpose.

WALKS AND DRIVES.

These are prominent and important features in ornamental grounds, exercising a marked influence upon their appearance, and the degree of enjoyment they may afford. They should therefore receive a due share of attention, both as to location and construction. Walks and drives should be so constructed that a few moments after the heaviest shower we can go over them without the slightest inconvenience. If garden walks are not properly made with stone and a good coating of gravel, it will be necessary to deny ourselves the pleasure of many a ramble through the garden.

Walks with graceful curves are on the whole most appropriate for small grounds. They lend a charm to the garden which straight walks do not. The walk from the street to the house must often, of necessity, be straight. This divides the lawn immediately in front into regular parts, requiring a certain style of formal planting, in order to preserve harmony. If, instead of a straight walk, a curved one be started at one side of the garden, the lawn will be irregularly divided, enabling another and more pleasing style of planting to be employed. The curves of the walk must be long and easy. It will sometimes require a good deal of labour to make the curves easy and pleasing. The walks should first be marked out with small stakes, and the curves must be arranged and re-arranged until they are satisfactory to the eye. A proof of easy curves is the facility with which they may be traversed, either on foot or in a carriage. If the curves are abrupt and difficult, the edges of the grass will suffer by being trampled upon, either by horses or foot passengers. Walks with curves are often badly designed, the curves being very difficult, thus spoiling the effect of good lawn planting. Straight walks, planted on either side with large growing trees, present a majestic appearance; on large, level grounds they may be

introduced with fine results; but curved walks are best adapted to ornamental planting, being more natural.

THE LAWN.

Since the introduction of the lawn mower, the lawn has come to be regarded as the great feature of a garden. When it is well kept there is nothing more beautiful or pleasing than a broad, open space of turf, and in the planting and arranging of trees it should be our endeavour to keep the lawn as open as possible. This can be accomplished by arranging the trees and shrubs in borders or belts around the margin, with a fine specimen tree occasionally standing alone in a prominent position, where its beauties can be seen to the best advantage.

BORDERS OF SHRUBS.

Many gardens are too much exposed. It has recently become fashionable to remove fences, and grounds thus opened might as well be public property. There is no seclusion or privacy, and every movement about the garden can be observed. One of the charms of a garden is the air of seclusion which should prevail there. To secure that privacy which all who are fond of gardening certainly desire, we would suggest the planting of a border inside the fence. This border can be varied in depth, according to the size of the garden. It should be a little higher than the lawn, and the outer line should consist of graceful curves. In this border can be planted a variety of shrubs, dwarf conifers, hardy plants, etc., but no trees. The shrubs and conifers should be planted irregularly, from three to four feet apart—the taller ones nearest the fence, and the dwarf subjects near the margin. For a border six feet in depth I would suggest two rows of shrubs, the first consisting of the larger growing ones, like Weigela, Deutzia, Forsythia, Japan Quince, Viburnum, Cornus Variegated, Red Dogwood, Tartarian Honeysuckle, Lance-leaved Spiraea, Syringa, Althaea, Calycanthus, Plum-leaved Spiraea, Barberry, Dwarf Spruce, Dwarf Pine and Juniper.

For the second row, Deutzia Gracilis, Mezereon Pink, Dwarf and Golden-leaved Syringa, Tree Pæonies, Dwarf Double Flowering Almond, Prunus triloba, Dwarf Weigela, Fortune's Dwarf White Spiraea, Plumed Hydrangea, Spiraea Thunbergi, Juniper Squamata and Tamarisk-leaved Juniper. The outer edge can be formed of Funkias, Dwarf Phlox, Japan Spiraea, Evergreen Candy tuft, Perennial Flax, Forget-me-not, Lungwort, Soapwort, Sea Pink, Sweet Violets.

Between the shrubs, near the front, may be planted lilies, tall phlox, and occasionally a hollyhock.

All the shrubs and plants which I have named are perfectly hardy, and if properly pruned can be kept of moderate size and good form. This selection will furnish a constant succession of bloom from early spring till late in the autumn.

The border should be lightly forked every autumn, and all the plants contained in it will be much benefited thereby.

In small gardens this border may be omitted altogether, and those who desire their gardens more exposed can, instead of a fence, plant a few shrubs irregularly—allowing the grass to grow quite closely around them. When fences have been removed along an entire street or avenue, the lines of each lot may be marked by planting shrubs in this way, relieving the lawn of that nakedness which would otherwise prevail.

Shrubs grown in a cultivated border thrive much better than they do grown in grass, and the border is therefore preferable.

Borders like the one above referred to may be formed at the sides of the garden, concealing division fences, if there be any. In these borders a great many varieties of shrubs may be employed, which during the summer will afford an unlimited amount of pleasure. In the smallest gardens this mode of planting may be adopted, leaving the centre of the lawn open, without a single tree or shrub. Fine effects may be produced if neighbours would unite and form a double border instead of fences, planting the taller shrubs at the centre, and the smaller ones at the outside, varying the sky outline by the introduction of a tree at intervals. In these side borders it is always well to employ shrubs that will not become too large, though any shrub, by proper pruning, can be kept small. This is the

great advantage we have in dealing with shrubs, and when we find that they become so large as to conceal too much, they can easily be cut back. While a certain amount of privacy is very desirable, it is not pleasant to be too much confined, and in arranging these borders this point must be kept in view.

In medium-sized places a few trees may be planted on the lawn. These should have a position at the side, rather than in front, as the view from the windows of the house should never be interfered with. Often only a single tree can be admitted—perhaps a handsome Cut-leaved Birch, Oak-leaved Mountain Ash, Purple Beech, Cut-leaved Beech, Young's Weeping Birch, or Weeping Cherry. All of these form beautiful specimens, and if a little care is bestowed upon them, each one when it attains age will be a picture in itself, always attractive and pleasing. Sometimes shade is required, in which case it is necessary to plant large growing trees within twenty feet of the house. I know of no tree which affords shade so quickly and withal is so handsome, as the superb Elm. Groups of Dwarf Conifers may be introduced on lawns, such as the Dwarf Norway Spruce, the lovely Juniper, compact Arbor Vite, Tamarisk-leaved Juniper, Dwarf Pine and Golden Yew. All of these are hardy, and when planted three together irregularly, or in the shape of a triangle, from three to five feet apart, will in time look pretty. In small grounds it is difficult without seeing them to say where these groups should be located. The situation must be studied, and nature imitated as far as possible.

Thus far I have not referred to flower-beds in lawns. It is a common practice to make beds of geraniums in the centre of a lawn. If the style of gardening which I have suggested be carried out, a flower-bed of this kind would be out of place.

Geraniums and other bedding plants may be employed to advantage close to the house, and can be cultivated either in beds or in borders. A fine border of mixed plants, consisting of Tea Roses, Heliotrope, Double Feverfew with Coleus and Centaureas intermingled, presents a beautiful appearance, and is very useful for cut flowers. Being near the house they are easily accessible, and do not detract from the beauty of a lawn. The edges of groups and borders of shrubs are beautified by the use of such plants. We cannot admire great masses of Geraniums, but employed as they should be, they enliven a garden, and may be considered indispensable.

GROUPS OF SHRUBS.

So far my remarks have referred more particularly to small or medium-sized gardens, such as are usually seen in cities. It is my intention now to say a few words on the grouping and massing of shrubs and trees, a mode of planting suited to large gardens and grounds; and it will be my endeavour to mention only those trees and shrubs which in the first place are generally regarded as perfectly hardy. In the selection of trees and plants too much stress cannot be laid upon this important qualification. Half hardy or tender trees usually afford little satisfaction, and frequently give great dissatisfaction. Besides, the list of perfectly hardy trees and shrubs is so large, that there is no necessity of using tender trees or shrubs, or those which have not been fully tested. For all sections of our country I know of nothing which will give more satisfaction than hardy deciduous ornamental trees and shrubs, and a few conifers. The northern climate is so severe that many of the finest conifers, being tender, cannot be employed. With extra care and protection they may live for a time, but not long. After considerable experience with half hardy trees and shrubs, I have come to the conclusion that planters who are unwilling to give such subjects extra care, had better not introduce them to their grounds. There is nothing so discouraging as to rear a fine tree, and just as it becomes beautiful, to lose it by severe cold. All those who live in cold climates and plant tender stock, run considerable risk. It therefore becomes necessary for those living in severe climates to make use of such trees and plants only as are capable of resisting great cold. There is no lack of this class of trees, and if planted judiciously every desirable effect may be realized, just as well as if the most expensive and unreliable half hardy conifer or shrub were used.

Groups of shrubs are well adapted to place in the hollows of the curves of walks. Masses of shrubbery thus arranged impart a variety to the landscape, and are in imitation of nature. In placing groups upon the lawn, care must be taken not to interfere with

the view from the windows of the house, as it is from this point that the pictures in our garden will be most frequently inspected. It should be our aim to form pleasing views from all of the principal windows, and if this object is kept in view from the outset, many serious errors will be averted.

To group shrubs so that they may appear natural and informal, is somewhat difficult. Stiff groups have an artificial appearance, never please the eye, and the effect is always unsatisfactory. Their outlines should be irregular, with swells and projections, not rounded and regular, as such masses frequently are. It is customary to give masses a circular or oval shape, with the tallest plants in the centre and the dwarfer ones at the outside. Extreme regularity of outline is thus attained, a result quite the contrary of that which ought to be aimed at. We should attempt to copy nature, making the groups resemble some natural ones which we have no doubt seen. While the taller shrubs should form the centre of the shrubbery, it will often be necessary to produce irregularity by planting them at intervals near the edges among the dwarfer subjects, thus producing an uneven sky outline. The bolder projections and swells should have the large shrubs, while the smaller and narrower parts should be planted with the lower growing shrubs, thus balancing nicely the various portions of a group. Single specimen trees will form a valuable adjunct to such a group when placed at its salient points. A number of desirable lawn trees can thus be employed without interfering with the open lawn and the views across it. There are some shrubs which, on account of their peculiar foliage, are especially valuable in groups.

The *Purple-leaved Berberry*, with its handsome purple leaves, yellow flowers and fine fruit, can be used effectively where a mass of one colour is desirable.

The *Golden-leaved Spiræa*, with its golden-tinted foliage, produces an effective contrast, but it must not be employed too frequently.

The *Purple leaved-Filbert* is remarkably showy and beautiful, and where it has a background of rich green foliage, it appears to great advantage.

A recently introduced variety of *Syringa*, with pale yellow leaves, is a very useful plant. Either as a single specimen, or used occasionally in a group, it lends a charm to surrounding shrubs, and will be much prized by those who desire to form pleasing contrasts.

The *Silver Variegated-leaved Cornelian Cherry* has remarkably handsome foliage, the leaves being broadly margined with silvery white. The variegation is permanent, and the plant as a whole has a peculiar richness and elegance, which justify the planter in giving it a choice position. When it is planted alone, and can enjoy abundance of room, it becomes very attractive and showy. In the border its bright foliage contrasts well with the green of other shrubs.

The *Dwarf Variegated Weigela* is an elegant shrub of dwarf habit, and has very pretty leaves, which are broadly margined with a silvery hue. The flowers are of a delicate flesh colour, or nearly white, and contrast beautifully with the foliage. Its compact, regular form, and bright foliage, render it unusually attractive and pretty. For the edges of groups and borders it has peculiar value.

The *Variegated Althæa* is another very handsome and showy shrub, with its leaves marked with light yellow. Its flowers are double, and of a purple colour. Among variegated-leaved shrubs this has long been a favourite, and its peculiar hardness adds to its value.

Koster's Variegated Weigela is distinct and quite ornamental, the margins of the leaves being bright yellow, while the flowers are rose-coloured. It is of low habit, and will be very acceptable as a companion for the dwarf variety previously named. It has another merit, of being of recent introduction.

I give special prominence to these purple and yellow-foliaged shrubs, because they possess striking peculiarities and are valuable material for effective work. But they must be employed judiciously, rather sparingly, for a profusion will surely create an exactly contrary effect from that which ought to be aimed at. Associated with shrubs having rich green foliage, a few of these purple and yellow-leaved shrubs produce fine effects. Whenever they are employed in groups, be careful to have an abundance of green about them, and if planted singly, use but few in a garden. In extensive grounds striking effects may be produced by planting a number of the purple in a mass, with a

row of yellow shrubs about. But groups like this are too artificial and formal, and are only admissible for distant effects.

Effective masses may be made of flowering shrubs; for example, by planting ten or twelve plants of *Weigela Desbois* together, using one of the dwarf varieties as an edging. The profusion of beautiful rose-coloured flowers with which every branch is thickly covered, and which wave gracefully in the air, will not fail to excite admiration, and the naturally straggling, irregular growth of the variety removes all appearance of stiffness or formality.

The *Plumed Hydrangea* can be used in a similar manner, with good results. When in flower its immense panicles bend gracefully, rendering a mass showy and elegant. Hundreds of panicles thus assembled present an admirable effect; but this mode of planting can only be recommended for extensive grounds.

The *Double-Flowering Plum* (*Prunus triloba*) and the dwarf *Double-Flowering Almonds*, white and rose, present a charming appearance when planted together. They flower at the same time, and their profuseness of bloom, delicacy and beauty of flower, satisfy the most fastidious, and excite admiration in the most indifferent observer.

FLOWERING SHRUBS OF SPECIAL MERIT.

A long list of species and varieties, as enumerated in the catalogues, is often perplexing. I think a brief reference to some which merit special attention will not be out of place.

Rose-Coloured Dogwood.—The common Red Dogwood is well known, and is desirable for its winter effects, its red branches being very showy when divested of their leaves. The variety under consideration has much brighter bark—of a bright rose colour, and the habit of the plant is more compact and bushy. Although not new, it is undoubtedly quite rare, and has much to commend it for the purposes for which the Red Dogwood is usually employed—winter effect.

The various varieties of *Japan Quince* are too well known to require any notice; still, the attributes which they possess are so important that I am prompted to say that we do not appreciate them as we ought.

The *Double-Flowering Deutzias* are rapidly growing in favour, and they ought to find a place in every garden, large or small. The dwarf single-flowering is a charming plant, which, on account of its small size, free flowering qualities and hardiness, cannot be too highly recommended for small gardens. It has ample bright green foliage, its flowers are snowy white, and are produced in great profusion early in June.

We have already referred to one variety of *Weigela* which cannot be praised too highly. It is called *Desboisii*. The old and well-known *Rosea* still holds its own against all new comers, on account of its fine habit. A vigorous growing, pure white *Weigela* has been much sought after, and it is gratifying to state that this want will soon be supplied. Another year, and this new variety will be offered for sale.

The *Forsythia*, with its golden bells, early in spring has few equals among shrubs; while the *Halesia*, with its pretty, white, bell-shaped flowers, always commands the admiration of all lovers of nature. The *Althæas*, as autumnal bloomers, have a special value, and are therefore indispensable. *Duc de Brabant*, which produces reddish lilac flowers, and *Leopoldii* (flore pleno), yielding rose-coloured blossoms, are two of the newer sorts, the qualities of which are commendable.

The large-flowering pink *Honeysuckle* is a charming shrub, and the old, sweet-scented *Syringa* must not be overlooked. The *Spiræas* are numerous, and the various varieties flower in succession from April till September. While all are so desirable as to seem indispensable, some have characteristics which entitle them to more than ordinary consideration. The *Double-Flowering Plum-leaved Spiræa*, though old and well known, is, in my opinion, one of the best shrubs in cultivation. Its habit is graceful and elegant, its foliage is glossy and fine, and its snowy white flowers are produced in the greatest profusion, and keep in perfection for a remarkably long period.

A large plant is attractive, even from a great distance, and the remarkable purity of its flowers always impresses the observer. While it is always useful and beautiful wherever employed, it seems to be specially adapted to cemetery lots.

Thunberg's Spiraea will always be admired for its graceful habit and delicate foliage. It does not grow large, and yields its blooms very early in spring. It is very appropriate for small gardens.

Fortune's Dwarf Spiraea, as its name indicates, does not grow large; nevertheless, it produces an abundance of flowers in August, when there is a great scarcity of bloom. It is much esteemed on that account, as well as for its naturally rounded, regular form. It is appropriate for small lawns, and for the margins of borders and groups.

The *Lance-leaved Spiraea* is an admirable shrub for the lawn. Its flowers are white and freely produced, and the foliage and habit of the plant are all that could be desired. I have already referred to the *Golden-leaved Spiraea*, which preserves its handsome yellow foliage the entire summer. Planted by itself on the lawn, it forms a conspicuous and beautiful object.

The *Lilacs*, with their immense panicles of fragrant flowers and rich foliage, will always be admired and esteemed. Two varieties deserve particular notice. *Cerulea superba* bears large clusters of blue, fragrant flowers, and *Rothomagensis* produces large panicles of red flowers. The *Viburnums* are a most valuable family, and the various members present an array of good qualities rarely met with. *Lantanoides* has fine foliage, and white flowers, followed with crimson fruit. Throughout the season, in the various stages of growth, flowering and fruiting, it is always charming, and merits wide dissemination.

The *Japan Snowball* is one of the best of the newer shrubs. Its plaited leaves are remarkable and beautiful, and its globular heads of white flowers are very showy. It surpasses the common variety in many respects. Its habit is better, foliage much handsomer, and the flowers are of a purer white and more delicate.

Among climbing shrubs for the decoration of houses, *Hall's Japan Honeysuckle* is superior to any other. It grows rapidly, its foliage is handsome, and almost evergreen, as it remains in perfection often till January; and its straw-coloured flowers have an exquisite fragrance, and are produced in the greatest abundance all summer. For the verandah it has no equal.

The *Clematis* is deservedly very popular. Superb varieties are just being propagated, but I cannot now refer to them.

For covering stonework, walls, etc., the *Japan Ivy* is most valuable. When introduced it was feared that it might not prove hardy, but it has withstood the severest winters. Its mode of growth is very interesting, and its foliage is glossy and luxuriant, without any coarseness. It furnishes a much handsomer covering for walls than the American Ivy, and is worthy of the attention of all planters.

I have spoken at some length of shrubs, because this class of plants is particularly adapted to small or medium-sized gardens. All that I have named are particularly hardy, of easy culture, and never fail to afford the greatest satisfaction. I desire to add a few words relative to the

PRUNING OF SHRUBS.

Many persons trim and shear them into regular shapes, imagining that regular outline adds to their effect and beauty. While symmetry and regularity of form are to be admired in a shrub, this quality should never be gained at the expense of health and natural grace. Each shrub has peculiarities of habit and foliage, and we should aim to preserve them as far as possible. Judicious pruning to secure health and vigour is necessary; but trimming all kinds of shrubs into one form shows a lack of appreciation for natural beauty, to say the least. *Weigelas*, *Deutzias*, *Forsythias* and *Mock Orange* flower on the wood of the preceding year's growth; hence these shrubs should not be pruned in winter or spring, but in June, after they have finished flowering, when the old wood should be shortened or cut out, thus promoting the growth of the young wood, which is to flower the following season.

Spiraeas, *Lilacs*, *Altheas* and *Honeysuckles* may be trimmed during the winter or during the spring, but the branches should only be reduced enough to keep them in good shape. The old growth should occasionally be thinned out, and the suckers and root sprouts removed when they appear. The best time, however, for pruning all shrubs is

when they have done flowering. The *Plumed Hydrangea* should be severely cut back and thinned early in spring.

TREES WITH COLOURED FOLIAGE.

Some trees have remarkably distinct and showy foliage, and are therefore peculiarly valuable for planting singly or in groups.

The *Purple Beech*, with its rich purple leaves, is unequalled among trees of its colour.

Schwedder's Maple, a new variety of the Norway, with purple foliage, is a charming tree, and promises to occupy a high place among purple-leaved trees. It is perfectly hardy, healthy and vigorous.

The *Blood-leaved Peach* has beautiful crimson foliage, and when making its young growth, is very striking. It grows rapidly, and becomes effective very quickly. It is not, however, a long-lived tree, and should only be used where immediate effects are desired, making provision for its loss, which is likely to occur in a few years.

The *Tricolour-leaved Sycamore* is one of the handsomest ornamental trees, its leaves being mottled and marbled with yellow. The variegation is constant and very effective. The *Purple-leaved Sycamore* is also a very interesting tree.

The *Golden Locust* has handsome gold-tinted leaves, and may be employed in groups very effectively.

Memminger's Horse Chestnut is one of the newer trees which is worthy of mention, on account of its peculiar foliage. Its leaves are, as it were, sprinkled and dotted with white, the effect of which is quite remarkable. As a single tree upon the lawn it is very attractive.

The *Silver-leaved Linden* is a charming tree of fine habit, and with rich silvery foliage. It deserves to be better known.

The *Variegated-leaved Bird Cherry* has handsomely variegated foliage. Its branches droop, rendering it a very graceful tree.

The *Royal Willow*, with its bright silvery leaves, is very conspicuous. In groups it is very effective.

The *Golden Oak*, as well as the *Purple-leaved Oak*, are both distinguished for their remarkable foliage.

The *Hybrid Mountain Ash* has very distinct grayish leaves, and is a choice tree.

The *Acuba-leaved Ash* has handsome, variegated leaves, and is very showy.

I have brought these trees with beautiful foliage together, so as to show what valuable material we possess for effective groups. If arranged judiciously and artistically, the most extraordinary results may be produced.

TREES DESIRABLE ON ACCOUNT OF THEIR ATTRACTIVE FLOWERS.

Under this heading I propose to enumerate a few trees desirable on account of their flowers. In the selection of trees this characteristic is often overlooked, and some of the best flowering trees are little esteemed.

I name first the *Virgilæa lutea*, which undoubtedly is the finest flowering tree we have. Its long, white racemes of pure white flowers hang gracefully about the tree and form a picture, the admirable points of which it is difficult to describe.

The *Chinese Magnolias* are so well known that it is not necessary to refer to them except in a general way. The *Judas Tree* may be associated with them in groups with fine results.

The *Large Double-Flowering Cherry*, *White Flowering Dogwood*, *Double Scarlet and Double White Thorns*, *White Fringe*, and the *Lindens*, are all admirable trees, and merit prominent places in ornamental grounds.

The *Double-Flowering Horse Chestnut* is justly admired for its elegant form and magnificent inflorescence. The absence of fruit, by which much litter is avoided, is an important argument in favour of its employment.

The *Red-Flowering Horse Chestnut* is surpassed by few ornamental trees.

Kolreuteria paniculata, with its golden yellow flowers, and *Catalpa syringafolia*,

producing great clusters of white and purple flowers, cannot be too highly prized, as they blossom at a season when flowers are very scarce.

The *Double-Flowering Peaches*, which flower immediately after the *Prunus triloba* and Dwarf Double-Flowering Almond, are very desirable. One variety produces double rose flowers, another double white, and another double red. At the flowering season every branch of these trees is thickly studded with blooms, which are remarkable for their size, beauty, and the length of time they remain fresh. The three are a trio of flowering trees which deserve to be extensively planted.

The *Scarlet Maple* yields a profusion of scarlet flowers early in spring before the leaves appear. It is very showy and ornamental.

TREES WITH CUT OR DISSECTED FOLIAGE.

Wier's Cut-leaved Maple has distinct foliage, and the half drooping habit of the tree renders it a handsome object upon the lawn.

The *Dissected-leaved Norway Maple* is much admired for its deeply-cut leaves.

The *Cut-leaved Japan Maples* are exceedingly showy and beautiful, but their slow growth and difficult propagation will always render them rare and expensive. Their hardiness is still questioned, although in our grounds they came through the past winter in good condition, unprotected. I do not lay much stress upon this class of trees, preferring to draw attention to thoroughly hardy, vigorous, rapid growing, easily propagated trees, which can be sold at moderate prices. When the hardiness of the Japan Maple is no longer in question, and its propagation has been rendered less difficult, it will be soon enough to suggest it to the public for general planting.

The *Imperial Cut-leaved Alder* and *Cut-leaved Weeping Birch* are two elegant trees which are much esteemed for lawn planting. The *Cut-leaved Beech* is one of those extraordinary trees which claim special attention. A proper consideration of its qualities will lead us to the conclusion that it is one of the finest trees known to cultivators. Hardy, vigorous, luxuriant, of pleasing outline, and possessing delicately cut foliage, it has all the valuable characteristics that could be asked for.

The *Oak-leaved Mountain Ash* merits the attention of planters, as it has few equals among handsome trees. Its regular and rich foliage makes it an object of much interest.

The *Cut-leaved Oak* is an interesting and beautiful tree.

OTHER NOTEWORTHY TREES.

Maiden Hair Tree, Broad-leaved Beech, Oak-leaved Beech, Willow-leaved Ash, Liquidambar, Scarlet Oak, Moss Locust, Laurel-leaved Willow, Rosemary-leaved Willow, Red Fern-leaved Linden, Elm *superba*, and Monumentalis.

DESIRABLE DROOPING TREES.

Young's Weeping Birch, Japan Weeping Cherry, Dwarf Weeping Cherry, White-leaved Weeping Linden, Camperdown Weeping Elm, Small-leaved Weeping Elm.

THE AMERICAN CRANBERRY.—(*Oxycoccus Macrocarpus*.)

ON THE PLANTING, CULTURE, SOIL, ETC.

BY F. TROWBRIDGE, MILFORD, CONN.

As the raising of Cranberries is receiving much attention from those interested in their culture, both in this country and in Europe, it may be of service to give a few facts in regard to the mode of raising them successfully.

The selection of land for cultivation and growing of plants is the first consideration—unless it is adapted to their growth, it will be useless to plant them.

The soil best adapted is low, moist land, suitably drained, so that the water will be

from twelve to eighteen inches under ground. They will grow on moderately damp soil that can be ploughed or cultivated (they will not do well on dry sand or clay soil), or on the borders of streams or ditches, as the plant draws its nourishment from air and water; light sandy soil, or peat covered with two or three inches of sand, is the best adapted to their culture. If planted on rich muck, or loam, they grow rank and strong, sometimes eight or ten feet, and cover the ground over with a net of vines three or four inches thick, but the crop will be light, as the fruit grows on the end of the shoot, and the rank growth throws out but few buds; but if sanded over the shoots are of small growth, and throw out more and stronger fruit buds. There are large portions of land all over our country that would grow large quantities of fruit that is now of but little worth, too wet and too cold for grass, if properly prepared by draining and sanding, would give good results.

In preparing the ground, if wet and spongy it should be drained, and the surplus water left about ten or twelve inches below the surface. It can then be prepared by burning over and removing the top soil—by carting off for compost, or burning when it is dry—by levelling the ground and covering it with pure sand (free from organic matter) two or three inches deep, to keep the surface loose, and to prevent foul grass from choking the plants. Some growers prefer putting on two or three inches of sand (on the ice), and after two years' growth spread on one or two inches more, which I think is an improvement. When the land is mixed with the soil, or top strata, it will invariably throw up weeds, and a large increase of labour is necessary to keep the ground clean. The roots of the Cranberry are very fine, and do not retain their vitality, but roots are thrown out from the stem—these should be put in with a notched stick, or dibble, to make a hole four or five inches deep, in which you place the plant—press the dirt around it with the heel of the boot.

The vines should be left from one to one and a half inches above ground. When planting, pour on water after setting, to settle the sand around the plant—the stem will soon start to grow. They are very tenacious of life, and if when removed they be put into water from fifteen to twenty hours before planting, if apparently dry they will regain their freshness, and are sure to grow; where failures have occurred, it has been owing to their having been taken from the parcel, and put out in dry soil.

Another plan adopted by some growers is to take the vines up without roots, often four or five feet in length, which they cut and sow in drills, or lay the vines down in a trench and cover with dirt, or with a stick two inches wide and half an inch thick; crowd the vines down three or four inches. It will take eight or ten barrels of clean vines per acre; in this case they are planted more shallow, and not so apt to live as when planted with a dibble, as proposed above, cut in suitable lengths. If planted two feet apart, each way, 10,000 plants will plant an acre; they can be cultivated with a cultivator or horse hoe, to keep down the grass and weeds; after one or two years' cultivation they will take care of themselves, or you will only need to pull out what little grass may grow. If wanted in small patches or in gardens, they can be planted a foot apart, and will cover the ground much sooner. They can be planted out at almost any season of the year when the ground is not frozen: in the fall, from September until the ground freezes; in spring, until July.

Overflowing.—It is desirable, and, I might say, indispensable to complete success, that the water can remain on the vines to the 10th or 15th of May, or until there is no danger from frost; it can cover the vines from one to two feet or more, and if it can be let on or off at will in the course of a few hours during the season, it will prevent drought, or the worm, which are very destructive sometimes. The water should not stand on them when in blossom, or quite green fruit.

Varieties.—The best known and most extensively cultivated have been the Bell, of which there are two or three varieties. The Cape Cod Bell are the best known, and have been more extensively cultivated than any other variety. The colour is a dark red, but they often vary in colour and shape on different soils, but the bearing and ripening qualities are the same—good size and medium early.

The Bugle is an old variety, rather early; size, medium to large; good keepers; colour dark scarlet; medium bearers.

Cherry generally grows on wet soil or moist upland. There are a number of

varieties; the one most commonly planted is of medium size, round shape, and bright red colour; good bearers, but later than other varieties; a still later kind, larger, and late in colouring; another called Mottled Bell, pink on white ground; very handsome fruit, but late and little grown. Two new varieties have lately been introduced, which, by a number of years' cultivation, we find superior to the above in several particulars; early and constant bearers when others have failed, and in the future we shall not plant any other. The two last years we should have had a short crop but for these kinds.

The Eaton's Early Black Bell stands first; it ripens very early, and is fully coloured by the 5th September in New England; uniform in colour and shape, very handsome dark-red colour, almost black; medium and uniform size; great and constant bearers; good keepers; vines hardy; being early, they bring the highest price in the market.

Mansfield Creeper.—This was first discovered in a corn-field, and transplanted to a cranberry bed. In its new position it was found to be entirely different in its growth and habit from all varieties; it seemed to creep on the ground, and take root at every point, bearing shoots every two or three inches on the vine; and throws out fruit buds for a fresh start another year. It is a few days later than the Eaton Bell, both adapted to upland culture. It is of large size, and a great bearer; the flesh is more tender, not as acid; fine keeper; colour dark-scarlet on one side, the other side nearly white, with a slight mottle; shape roundish oval.

REPORT OF THE COMMITTEE APPOINTED BY THE FRUIT GROWERS' ASSOCIATION OF ONTARIO TO AID IN DIRECTING THE HORTICULTURAL DEPARTMENT OF THE ONTARIO SCHOOL OF AGRICULTURE AT GUELPH.

To the Honourable the Commissioner of Agriculture:

SIR,—The Committee appointed by the Directors of the Fruit-Growers' Association to aid in arranging and directing the operations in Horticulture and Forestry at the Government Institution at Guelph, beg to submit the following Report:

During the season the orchard of five acres of standard fruit trees planted last year has been extended so as to cover about seventeen acres, and a considerable portion of the spaces between the trees planted with small fruits. The fruit trees consist of the following varieties:—

APPLES.

10 Early Harvest.	10 Talman's Sweet.
5 Benoni.	10 Cox's Orange Pippin.
2 Tetofsky.	2 Fallawater.
2 Early Strawberry.	2 Jonathan.
5 Sweet Bough.	2 Baxter's Red.
10 Hawthornden.	2 Monmouth Pippin.
10 Chenango Strawberry.	2 Newtown Pippin.
20 St. Lawrence.	5 Peck's Pleasant.
10 Fall Pippin.	2 Canada Reinette.
25 Duchess of Oldenburg.	2 Rome Beauty.
10 Pomme Royal.	2 Smith's Cider.
8 Blenheim Orange.	2 White Winter Pearmain.
2 Sutton's Early.	2 Willow Twig.
20 Rhode Island Greening.	2 Bottle Greening.
20 Grimes' Golden.	5 Bailey's Sweet.
25 Swayzie Pomme Grise.	2 Calkins' Pippin.
20 Wagener.	2 Clarke's Orange.
2 Ohio Nonpareil.	2 Haas.
10 King of Tomkins County.	2 Jefferson.

Apples—continued.

2 English King of Pippins.	10 Wealthy.
2 Lord Burleigh.	20 Ribston Pippin.
2 Lyon's Dessert.	10 Mann Apple.
2 Mere de Menage.	10 Norton's Melon.
5 English Russet.	5 Stott's Russet.
2 Omar Pasha.	2 Black Detroit.
10 Shiawasse Beauty.	50 Northern Spy.
2 Cellini.	2 Rawle's Genet.
2 McIntosh Red.	2 Red Canada.
2 Wallbriege.	5 Seek no Further.
2 Addie.	5 Vandevere.
2 Eveline.	2 White Pippin.
2 Baxter.	2 Brabant Bellflower.
10 Keswick Codlin.	2 Bethel.
10 Red Astrachan.	5 Chebucto Beauty.
2 Yellow Transparent.	2 Capp's Mammoth.
2 Early Joe.	2 Flushing Spitzenburg.
2 Williams' Favourite.	2 Irish Peach.
10 Twenty Ounce.	2 Kingston Seedling.
10 Alexander.	2 Lord Derby.
5 Beauty of Kent.	2 Lady Hennicker.
25 Gravenstein.	2 Marquis of Lorne.
2 Jeffries.	2 New Hawthornden.
5 Maiden's Blush.	2 Morton's Red.
2 Hawley.	2 Pepper's No. 1.
50 American Golden Russet.	2 Minister.
10 Roxbury Russet.	2 Porter.
10 Yellow Bellflower.	2 Ackerman.
20 Baldwin.	2 Canada Baldwin.
10 Snow Apple.	2 Andrew's Favourite.
2 Perry Russet.	2 May.
10 Swaar.	2 Martha.

PEARS.

2 Des Nonnes.	5 Tyson.
5 Beurré d'Anjou.	2 Mount Vernon.
5 Bartlett.	5 Flemish Beauty.
5 Goodale.	5 Dr. Reeder.
2 Bloodgood.	5 Brandywine.
5 Manning's Elizabeth.	2 Beurré de Waterloo.
3 Beurré Hardy.	2 Beurré Superfin.
2 Napoleon.	2 Buffum.
2 Doyenné Boussock.	5 Howell.
2 Paradise d'Automn.	2 Paul Ambre.
2 Swan's Orange.	5 Beurré Clairgeau.
2 Beurré Diel.	2 Doyenné du Comice.
2 Jones' Seedling.	2 Glout Moreau.
5 Josephine de Malines.	2 Pound.
2 Pratt.	2 Rutter.
2 Brockworth Park.	2 Dearborn's Seedling.
2 Ananas d'Eté.	2 Duchess de Berri d'Ete.
2 Doyenné d'Eté.	2 Elliot's Early.
2 Prince Albert.	2 Pitmaston Duchesse.

PLUMS.

10 Lombard.	2 Duane's Purple.
2 Bradshaw.	2 Coe's Golden Drop.
2 Fellenburgh.	2 German Prune.
2 General Hand.	5 McLaughlin.
5 Imperial Gage.	2 Lawrence's Favorite.
2 Yellow Egg.	2 Munroe.
2 Orange Egg.	2 Smith's Orleans.
2 Peter's Yellow Gage.	2 Gueii.
2 Prince Englebert.	2 Victoria.
2 Washington.	2 Denniston's Superb.
5 Hudson River Purple Egg.	2 Peach Plum.
2 Quackenboss.	1 Goderich.
1 Evans.	1 McGill's Seedling.
2 Mill's Seedling.	2 Ontario.

CHERRIES.

5 May Duke.	2 Elton.
2 Tradescant's Black Heart.	3 Olivet.
2 Downer's Late Red.	2 Coe's Transparent.
2 Knight's Early Black.	2 White French Guigne.
2 Yellow Spanish.	2 Gridley.
2 Monstreuse de Mezel.	2 Rockport Bigarreau.
2 Carnation.	10 Early Richmond.
2 Empress Eugenie.	2 Late Duke.
2 Montmorency Ordinaire.	2 English Morello.
2 Reine Hortense.	2 Norton's Seedling.
2 Lieb.	

In all, these number—of apple trees 678, pear trees 112, plum trees 70, and cherry trees 54. Among the fruit trees of last year's planting, there were planted the following small fruits:—

GOOSEBERRIES.

100 Downing's Seedling.	100 Houghton's Seedling.
100 American Seedling.	100 Smith's Improved.

400 in all.

RED AND WHITE CURRANTS.

200 Fertile de Pallou.	25 Cherry.
100 Versailles.	25 Red Dutch.
50 White Grape.	25 London Red.
25 Red Grape.	50 Victoria.

In all 500.

BLACK CURRANTS.

100 Black Naples.	100 Lee's Prolific.
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In all 200.

RASPBERRIES AND BLACKBERRIES.

300 Cuthbert.	200 Brandywine.
500 Philadelphia.	100 Highland Hardy.
100 Herstine.	100 Thwack.
100 Turner.	200 Clarke.
100 Franconia.	200 Gregg.
500 Mammoth Cluster.	100 Davison's Thornless.
100 Doolittle Black Cap.	100 Ontario.
100 Niagara.	100 Saunders' Hybrids.
100 Reliance.	100 New Rochelle.
12 Caroline.	

In all 3,112 plants.

STRAWBERRIES.

1400 Crescent Seedling.	200 Sharpless.
200 Monarch of the West.	200 Captain Jack.
500 Jucunda.	100 Glendale.
200 Triomphe De Gand.	100 Kentucky.
100 Nicanor.	200 Charles Downing.
100 Mount Vernon.	100 Cumberland Triumph.
100 Great American.	100 Mary Fletcher.
100 Alpha.	100 Maggie.
100 Arnold's Pride.	100 Bright Ida.
200 Early Canada.	

4,200 plants in all.

VINERY.

A very eligible location has been selected for a vinery on the crest of the hill at the back of the College buildings, and sloping down towards the south ; the soil is very suitable, and the aspect all that could be desired, and when completed, and the vines have attained some growth, the vinery will present a very handsome appearance from the back of the College grounds and buildings. Herewith is a list of the vines which have been planted :—

25 Burnet.	25 Moore's Early.
200 Concord.	50 Delaware.
25 Massasoit.	25 Wilder.
12 Agawam.	12 Salem.
5 Barry.	5 Gaertner.
5 Herbert.	12 Lindley.
5 Merrimac.	5 Senasqua.
6 Martha.	3 Hartford Prolific.
10 Champion.	3 Eumelan.
3 Israella.	3 Iona.
12 Creveling.	3 Early Dawn.
10 Brighton.	50 Clinton.
2 Canada.	3 Brant.
2 Amber Queen.	2 Black Hawk.
2 Alvey.	2 Croton.
2 Cuyahoga.	2 Elvira.
2 Ives' Seedling.	2 Lady.
2 Munroe.	2 Telegraph.
10 Worden.	1 Duchess.
1 Rochester.	1 Lady Washington.
1 Jefferson.	1 Prentiss.
2 Pocklington.	1 Walter.
1 Black Eagle.	2 Rogers' No. 30.
1 Maxatawny.	1 Eva.
2 Vergennes.	1 Pearl.

To which may be added three of Mr. Dempsey's new hybrids, presented by him for the purpose of having their value tested in this locality—1 No. 4, 1 No. 18, and 1 No. 25. In all 567 vines.

FORESTRY.

In this department, also, the Committee have laboured to lay a good foundation both by forest planting during the season, and by securing such portions of material as could be obtained in advance for next year's planting. All failures in clumps of Black Walnut planted last year have been replaced, also those in the plantation of European larch; besides which, four additional clumps have been planted of about half an acre each, all in such situations as will permit of their serving a double purpose, either as shelter or ornament, or for the hiding of unsightly buildings. These consist of a clump of Butternut, one of Sugar Maple, one of Ash—European and American—and one of mixed forest trees, such as Ash, Elm, Hickory, Larch and Walnut.

We have also secured and had planted in rows, in a nursery bed, a considerable number of trees of the following varieties: Hickory, White Oak, Birch, Beech, Black Spruce, Hemlock, Arbor Vita, Native Larch or Tamarack, Native Pine; also an additional quantity of Sugar Maple and European Larch. All this young stock will be available for planting during the next and succeeding years, and the Committee hope and expect that by thus anticipating future wants in this direction, and providing a sufficient quantity of suitable young trees, well grown in nursery rows, with good roots, to obtain more successful results in forest planting than heretofore, the young growing trees in the meantime affording a means of instruction to the young men who have the charge of them.

ARBORETUM.

This important and instructive section of Arboriculture in connection with the College grounds has received large additions during the past year—so large, indeed, that the ground set aside for this purpose has been filled, and some additional space will now be required for the continuance of this very important educational feature in connection with the College. It is the purpose of the Committee to continue to add to the arboretum until it shall contain a specimen, properly labelled, of every tree and shrub which will grow in this locality. The following have been planted during the past season, one specimen of each sort:—

Euonymus European.
 Hybiscus Syriacus carnea pleno.
 “ “ Alba flore pleno.
 “ “ purpurea fl. pl.
 “ “ foliis variegata.
 “ “ Lady Stanley.
 Exochorda grandiflora.
 Itea virginica.
 Kerria Japonica.
 Ligustrum Japonica var.
 Lonicera Alba grand.
 Rhus cotinus.
 Philadelphia coron. Zeyheri.
 Spirea Ballardi.
 “ Douglassi.
 “ opulifolia aurea.
 “ Salicifolia.
 Mountain Ash, oak-leaved.
 New American Mulberry.

Nettle Tree, Australian.
 “ “ American.
 Pawlonia Imperialis.
 Paul's Scarlet Thorn.
 Double Pink Thorn.
 Ailanthus glandulosa.
 Ash, American.
 “ Acuba-leaved.
 “ Golden barked.
 “ Jaspidea.
 “ Walnut-leaved.
 “ Willow-leaved.
 “ Spectabilis.
 “ green.
 Akebia quinata.
 Wistaria frutescens.
 “ Japonica.
 “ magnifica.
 “ multijuga.

- Wistaria Sinensis.
 " " alba.
 Retinospora obtusa.
 " pisifera.
 " squamosa.
 Callicarpa purpurea.
 Corylus purpurea.
 Acer spicatum.
 " Tartaricum.
 Acacia julibrissin.
 Viburnum sterilis.
 Linden, cut-leaved.
 Magnolia glauca.
 Maple colchicum.
 " Hance's variegated.
 " Oregon.
 " purple-leaved Sycamore.
 " striped Bark.
 Osage Orange.
 Willow, white.
 " ring-leaved.
 " purple.
 Aralia Japonica.
 Spanish Chestnut.
 Cypress, Chinese Weeping.
 " deciduous.
 " new weeping.
 Dogwood, white flowered.
 Elm, pyramidal.
 Linden, American.
 Box, Handworthii.
 " sempervirens.
 Willow, royal.
 " Salamon's.
 Arborvitæ, pyramidal.
 " globe.
 Juniper, prostrate.
 " Sabina.
 " ericoides.
 Spruce, Engelman's.
 " Menzie's.
 Clethra alnifolia.
 Cornus mas.
 " " variegated.
 Alder, cut-leaf.
 " maritima.
 Amelanchier botryapium.
 Anona triloba.
 Birch, lenta.
 " poplar leaf.
 " red.
 " paper bark.
 " yellow.
 " purple.
 Carya alba or Hickory nut.
 " aquatica.
 " microcarpa.
 Carya porcina.
 " sulcata.
 " tomentosa.
 " amara.
 " olivæformis.
 Fraxinus, heterophylla.
 " Theophrasta.
 " platycarpa.
 " quadrangulata.
 " sambucifolia.
 " excelsior.
 " Americana.
 Magnolia acuminata.
 " glauca.
 Negundo fraxinæfolia.
 Platanus occidentalis.
 Pyrus laciniata.
 Populus alba.
 " monilifera.
 " angulata.
 " angustifolia.
 " Empress Eugenie.
 Quercus nigra.
 " obtusiloba.
 " palustris.
 Andromeda arborea.
 Aralia spinosa.
 Catalpa bignonioides.
 " nana.
 " speciosa.
 Celtis occidentalis.
 " pumila.
 Cereis Canadensis.
 " siliquastrum.
 Cerasus padus.
 " Virginica.
 " double-flowering Chinese.
 " Carnea plena.
 " ranunculiflora.
 Gleditschia horrida.
 Gymnocladus Canadensis.
 Juglans cinerea.
 Kolreuteria paniculata.
 Laurus sassafras.
 " benzoin.
 Liquidambar styracifera.
 Liriodendron tulipifera.
 " integrifolia.
 Morus rubra.
 " Downing's.
 Ostrya Virginica.
 Quercus alba.
 " aquatica.
 " bicolor.
 " Bannisteri.
 " cinerea.
 " coccinea.

- Quercus imbricaria.*
 " *lyrata.*
 " *macrocarpa.*
 " *prinus.*
 " *rubra.*
 " *robur.*
 " *tinetoria.*
Salix alba.
 " *annularis.*
 " *caprea.*
 " *candida.*
 " *discolor.*
 " *Forbyana.*
 " *Japonica.*
 " *myricoides.*
 " *pentandra.*
 " *Russelliana.*
 " *rosmarinifolia.*
 " *Villarsiana.*
 " *vitellina.*
Cotoneaster vacillaris.
 " *floribunda.*
 " *obtusa.*
 " *acuminatus.*
 " *buxifolia.*
 " *frigida.*
Crataegus oxycanth. variegata.
 " " *Douglassii.*
 " " *rubra splendens.*
 " *crus-galli.*
 " *apiifolia.*
 " *cordata.*
 " *flava.*
Hydrangea quercifolia.
 " *flavescens.*
Hypericum ascyron.
 " *prolificum.*
 " *Kalmianum.*
Magnolia Soulangeana.
Salisburia adiantifolia.
Staphylea trifolia.
Sophora Japonica.
Tamarix tetrandra.
Tilia Americana.
 " *Europea aurea.*
 " *heterophylla.*
Ulmus montana.
 " *fastigiata.*
Zanthoxylum fraxineum.
Andromeda mariana.
 " *racemosa.*
Amygdalus nana, pink.
 " " *white.*
Azalea viscosa.
Ceanothus Americana.
Cephalanthus occidentalis.
Colutea arborescens.
- Cornus alternifolius.*
 " *paniculata.*
 " *sericea.*
 " *stricta.*
Deutzia, Pride of Rochester.
Eleagnus flava.
 " *parvifolia.*
Euonymus, Europeus var.
 " *Americanus.*
Hamamelis Virginica.
Halesia tetraptera.
 " *Meehani.*
Lonicera orientalis.
 " *Philomela.*
 " *Sibirica.*
 " *xylostium.*
Ligustrum buxifolium.
 " *myrtifolium.*
Myrica cerifera.
Pavia macrostachya.
Philadelphus Gordonianus.
 " *Columbianus.*
 " *tomentosus.*
 " *Keteleeri.*
Pyrus Japonica, white.
 " " *variegata.*
 " " *cardinalis.*
 " " *semiterna.*
 " " *malus prinos.*
 " " *floribunda.*
Ribes Utah, blue.
 " " *black.*
 " " *yellow.*
 " *Floridum.*
 " *Gordoni.*
 " *Sanguineum albidum.*
Syringa Vulgaris, purple.
 " " *white.*
 " " *rubra insignis.*
 " " *Dr. Stockhardt.*
 " " *valliettiana.*
 " " *double purple.*
 " *Gloire de Moulins.*
 " *Persica.*
 " *oblata.*
 " *Princess Mariae.*
Weigelia multiflora.
 " *Groenwegonii.*
Weeping Cherry.
Biota orientalis.
 " *aurea.*
Ilex opaca.
Juniperus suecica.
 " *Virginiana.*
Kalmia latifolia.
Ligustrum ovalifolium.
 " *Stauntoni.*

<i>Prunus umbellata.</i>	<i>Andromeda calyculata.</i>
“ <i>Americana.</i>	<i>Euonymus radicans</i> , variegated.
“ <i>Chicasa.</i>	<i>Genista scoparius.</i>
<i>Ptelea trifolia.</i>	<i>Juniperus communis.</i>
<i>Rhus copallina.</i>	“ <i>occidentalis.</i>
“ <i>glabra.</i>	“ <i>Sabina.</i>
“ <i>typhina.</i>	<i>Kalmia angustifolia.</i>
“ <i>trilobata.</i>	<i>Pinus Benthiana.</i>
<i>Rhamnus Caroliniensis.</i>	“ <i>Lambertiana.</i>
“ <i>frangula.</i>	“ <i>mugho.</i>
<i>Rosa rubiginosa.</i>	“ <i>pungens.</i>
“ <i>rugosa.</i>	“ <i>ponderosa.</i>
<i>Robinia hispida.</i>	“ <i>strobilus.</i>
<i>Spiraea aurea.</i>	<i>Thuja ericoides.</i>
“ <i>carpinæfolia.</i>	“ <i>Geo. Peabody.</i>
“ <i>crinita.</i>	“ <i>glauc.</i>
“ <i>chamadraefolia.</i>	“ <i>spiralis.</i>
“ <i>Indica.</i>	<i>Highland Juniper.</i>
“ <i>nobleana.</i>	<i>Pinus inops.</i>
“ <i>Regeliana.</i>	“ <i>laricis.</i>
“ <i>sorbifolia.</i>	“ <i>mitis.</i>
“ <i>Thunbergi.</i>	“ <i>pinaster.</i>
“ <i>vaccinæfolia.</i>	“ <i>rigida.</i>
<i>Vaccinium corymbosum.</i>	<i>Podocarpus Japonica.</i>
<i>Viburnum acerifolium.</i>	<i>Thuja gigantea.</i>
“ <i>lentago.</i>	“ <i>Hoopesii.</i>
“ <i>nudum.</i>	“ <i>pumila.</i>
“ <i>prunifolium.</i>	“ <i>Tartaricum.</i>

MISCELLANEOUS.

The following have also been secured and planted in rows, from which they may at any time be transplanted to any location where they may be required: For hedge plants, 1,000 two-year-old Barberry plants; 1,000 one-year-old Buckthorn; 100 two-year-old Buckthorn; 1,000 two-year-old Honey Locust. Also

20 Cannas.	100 Gladiolus, mixed.
12 Iris, new sorts.	12 Tuberous Rooted Begonias.
50 Hardy Herbaceous Plants.	100 Hardy Herbaceous Phloxes and Peonies.
25 Hybrid China Roses.	1 English Honeysuckle.
1 Clematis Erecta.	2 Japan Honeysuckles.

The results of the planting this year have on the whole been very satisfactory, and while there have been some failures, they are few as compared with the total amount of material planted.

FUTURE OPERATIONS.

During the coming spring your Committee propose to replace all failures, continue and extend the forest planting, make additions to the arboretum and ornamental department, extend the orchard, and, if possible, complete the shelter belts for the protection of the young trees. Before the orchard and shelter belts can be completed, it will be absolutely necessary that an acre of land, which now makes a most unsightly break in the middle of the orchard, be purchased. This land is not put to any use by the owner, and has become a general distributing point for weeds, and is most unsightly in every way. To carry out the planting for next season we shall require a further grant of \$300.

We take pleasure in acknowledging the cordial assistance which has been rendered

us by the Principal (Prof. Mills), the Professor of Agriculture (Prof. Brown), and to the able and painstaking manner in which the Head Gardener, Mr. Forsyth, has discharged the onerous duties devolving upon him.

All of which is respectfully submitted.

P. C. DEMPSEY.

WM. SAUNDERS.

D. W. BEADLE.

SMALL FRUIT CULTURE.

BY B. GOTT, ARKONA.

It is a task not easily defined to state with precision just which kind of soil is positively best for the different classes of small fruits. We doubt not that different results will be obtained by planting the same fruit on different soils, and much more different by planting different fruit on different soils; but to say exactly which is the best for obtaining the best results is a question for scientific and superior investigation. At a former period in our experience, we most decidedly held the opinion that a fine, strong, well-drained sandy loam, rich in vegetable ingredients, and not too loose, was the best possible condition of soil for strawberries and raspberries; but later on in our course of fruit culture, and as our observations widened in these matters, our opinion came gradually to a wide and material difference of caste, and now we strongly lean to a preference for a strong and well-drained clay loam for both these fruits, if not too much condensed.

One of our local growers has a small fruit farm established on just such a description of soil as this last, and the results of his plantings are all that could be desired—plenty of fruit, and of fine quality. If there is any advantage in favour of the sandy loam for small fruits, it may be on the score of wintering; for on this soil the plants do not appear so liable to frost and heaving as on the clay soil. The flavour, too, may be very much finer in fruits from sandy soil, but we most emphatically deny that the fruit may be either more or of better quality. Any of our clay loams, therefore, of proper texture, and if thoroughly and systematically drained, are clearly suitable for the successful growth and development of small fruit plants and of the finest possible quality of fruit.

With these preliminaries we will at once proceed with our subject in hand, viz.: Character of Soil for Small Fruits; Its Preparation, Culture, etc. By small fruits we shall at present understand to be meant our popular berries, as strawberries, raspberries, blackberries, gooseberries, and currants; and for their successful culture we shall prefer a medium clayish loam, of a dark colour and a crumbly texture, and very rich in vegetable matters in composition, and laying on a solid clay subsoil at the depth of from twelve to twenty inches from the surface.

We would prefer the surface to be nearly on a level, or, at the most, with merely gentle slopes to prevent severe washing from heavy and frequent rains. The whole must be thoroughly underdrained, by laying at systematic distances hard-burnt clay tile, two inches in diameter in the bore, and from two to three feet under the surface. These drains should not be more than twenty or thirty feet apart, according to the dryness or wetness of the soil, and the whole laid with a careful reference to a good and efficient outlet. The mode of preparation consists in thoroughly cleansing the ground of all annoyances, as stumps, stones, sticks, etc., as impediments to the easy progress of the plough and the cultivator. Before the planting is done the ground must be thoroughly broken up to a depth of ten or twelve inches by good ploughing and subsoiling, and after cultivation during the entire summer. For the soil I am now describing being in a virgin state and unexhausted, very little application of artificial fertilizers is required; but if the ground is worn out, or in the least depleted of its vegetable fertility, those artificial stimulants must be most certainly applied with unsparing liberality. This application, in the main, must be made during the workings of the summer months.

The after culture consists, in the main, of a thorough and constant moving and stirring of the soil to prevent the effects of summer drouth and the progress of the least tiny weed. This point—the eradication of all weeds—must be most assiduously attended

to from the beginning, and the success of the whole operation mainly depends upon the efficiency of this part of the work. Do not consider the weeds merely in the light of a curse, but rather as a blessing in disguise, and go at them with a settled determination of will. In the culture of strawberries for market, the planting is generally proceeded with in the following manner:—The ground being, as described, thoroughly prepared, is then marked off in distances of three or four feet apart, entirely across the field, and the plants set in those rows $1\frac{1}{2}$ feet apart. The season for doing this is as early as the ground can be profitably worked in the spring of the year. You have now your field nicely set with plants, at regular distances 2×3 feet apart, or 7,260 plants to the acre. The first season nothing is to be done but thorough cultivation and cleaning, and nothing is to be expected of them but to grow out, occasionally directing the young plants where to root as the runners push out. The object is to cause the young plants as much as possible to root in the rows, and there mass up; and keep the spaces between clear for cultivation and gathering the fruit. In this system scarcely any fruit is matured the first year; but in the second year a very large and heavy crop is the result of thorough and patient care, and will amply reward all the labour and expense incurred. This method is continued two or three or more years, according to circumstances, and the whole is then ploughed up and planted with some other crop, or the ground is thoroughly manured and again planted with the same fruit.

For planting in the hill system the ground is marked off 3×3 feet, or 4,840 hills to the acre, and the plants are carefully set at the crossings in the shape of a triangle, three plants to a hill. This makes a very nice plantation, and is carefully and thoroughly kept, cultivated, and cleaned from all weeds, and the runners scrupulously kept closely cut off. In this way, large and fine masses of fruit are matured the second year in large clusters around the hills. This system is much more expensive than the first, and nothing but constant watchfulness and labour can expect to be successful with it. The hills must be underlaid with straw as the fruit is ripening, to prevent it being damaged by contact with the neighbouring earth, and so making it unfit for use. Both of these systems of strawberry-culture have their stern advocates; but we greatly prefer the first, as it seems more practicable for general field culture in a country like this, where every item of labour is intensely expensive.

For raspberries, gooseberries and currants, the land is prepared as before, and marked off 3×6 feet, or 2,620 plants to an acre, and the young plants placed in the crossings. The matter of planting raspberries is very simple and easy, and consists in merely placing the young plants, previously prepared, in their places with a spade and tramping them firm. The planting of gooseberries and currants, however, requires much more labour and care, as the plants used are fine, thrifty, two-year-old plants, and have plenty of long fibrous roots that must be carefully placed as the planting goes on. Careful and constant cultivation must not be neglected, and regular prunings must be attended to. Blackberries are planted as are raspberries, but the distance apart for the plants must be far greater, or 6×6 feet, being 1,210 plants to an acre. For this fruit, being so rampant and irresistible in its growth, constant and systematic prunings are necessary, and cannot be dispensed with for a season. If this is not attended to, neither cultivation nor fruit-gathering can be proceeded with with safety or profit. In a former paper on small fruits I have sufficiently indicated the varieties of these fruits preferable for the purpose of planting. I have, therefore, now nothing further to do in this paper than to throw out some hints on the profitableness of small-fruit culture and the condition of the market.

The demand for small fruits is annually increasing in most of our respectable country markets, and the difficulty of disposing of a fine crop of fruit is annually decreasing. It is this demand in the market that regulates the price of small fruits, as of every other commodity, and consequently determines the question of its profitableness. If a large crop of small fruit, as of anything else, is put upon a flush market, the profit side of the account sinks; but if the same crop can be put upon a keen market, the balance rises in grateful proportions. Again, the question of profitableness is determined by the method of culture, the nature of the soil, its location, etc., the skill in management, and the economy of gathering and marketing the crop.

By this it will easily be seen that the question of product is not by any means the

only question in the profitableness of the crop. In all cases where the business is studiously and intelligently followed on from year to year, with perseverance, good judgment, and favourable circumstances, small fruit culture is universally found to pay, and amply pay, the painstaking cultivator. Let none, therefore, be discouraged in their attempts, but wherever good, sound taste for the business exists, accompanied by a small amount of capital at command, and a moderate amount of experience, any one may engage in it with an absolute certainty of being well repaid for their outlay in this direction.

FRUIT REPORT FOR SECTION NO. 4.

This Section consists of Lennox and Addington, Prince Edward, Hastings, Northumberland and Durham, nearly all of which are tolerably good for "general fruit-growing"—probably the most favoured sections are the counties of Prince Edward and East Northumberland. Very large quantities of strawberries are annually shipped from here, principally to Montreal. The following varieties for market are the favourites here:—Wilson's Albany, Crescent Seedling, and Sharpless. The Captain Jack, New Dominion, and some of Arnold's varieties, are promising well, but have not yet been thoroughly tested here. Large quantities of raspberries are also shipped from here; the most prolific bearer is the Philadelphia Red, but rather soft for market; the Clarke, Herstine, Queen of the Market, are not so prolific, but better for market.

Black Raspberries.—Mammoth Cluster, Davidson's Thornless, Gregg, and Doolittle, do well on loamy soil.

Currants.—The varieties that succeed best here are Red Cherry, La Versailles, and White Grape. Among black currants the Black Naples is most popular.

Gooseberries.—Houghton's Seedling and Smith's Improved succeed best.

Cherries.—A number of varieties, but the Early Richmonds are most successful.

Grapes.—A large variety of grapes are grown, principally the Concord, Delaware, Burnet, Brighton, and a number of Rogers' Hybrids. The newer varieties are being tested, some of which look very promising, particularly the Pocklington.

Plums.—The cultivation of plums in this section is at a discount, owing to the curculio and rotting of the fruit. Lombards, Smith's Orleans, Imperial Gage, Pond's Seedling, are all good on heavy clay.

Pears.—The cultivation of pears is very uncertain, owing to the fire blight, many hundreds having been ruined during the last two years: Clapp's Favourite, Manning's Elizabeth, Bartlett, Beurre Hardy, White Doyennè, Beurre Bosc, Beurre d'Anjou, Josephine de Malines, Lawrence.

Apples.—The region within a few miles of the Bay of Quinte as an apple-growing country is notably unsurpassed. The following varieties are found most valuable for market purposes:—Red Astrachan, Early Harvest, Duchess of Oldenburg, St. Lawrence, Colvert, Alexander, Northern Spy, Baldwin, Rhode Island Greening, Golden Russet, Roxbury Russet, King of Tompkins County, and Ben Davis. The following new varieties are doing well:—Wealthy, Ontario, Dora, Ella, Arnold's Beauty, Peewaukee, Winter St. Lawrence, and Cox's Orange Pippin.

It is impossible to ascertain the quantity of fruit shipped from this section, but many thousands of barrels are shipped annually to British and foreign markets. The following is as nearly correct as possible, viz:—

Small fruit, for 1880.....	50,000 quarts.
“ “ “ 1881.....	200,000 “
Plums “ “ 1880... ..	5,000 bushels.
Pears “ “ “	2,000 barrels.
Apples “ “ “	150,000 “

For the present year, with the exception of small fruits, the crop will be much short of last year. The apple crop of 1881 is only about 25 per cent. of that of 1880.

REPORT FROM DIVISION NO. 5.

In accordance with a resolution passed at a meeting of the "Board," at Owen Sound, and in conformity with your notice of the 6th inst., I submit the following Report on Fruits, etc., for the Fifth Agricultural Division of the Province:—

The strawberry crop was unusually good in the northern part, and a good average in the southern part of the division. Prices ranged from 15 cents to 8 cents per quart. Contracts were made with some of the larger growers for 8 cents for the whole crop. The Wilson is almost the only strawberry grown here, and so long as this variety continues to produce such excellent crops of large, luscious and beautifully coloured berries, people will be slow to speculate with new varieties. From a large lot ready for the market, I selected five baskets, and found them to contain an average of sixty-eight (68) berries to the basket.

Raspberries were less than an average crop. The canes—where I had an opportunity of observing them—seemed to lack vigour; they bloomed freely; but the fruit did not set well, and, when ripe, was much smaller than usual. Probably the extremely low temperature of the air in January last may have so weakened the canes as to prevent the fruit setting freely. The kinds generally grown here are the Philadelphia, Brinkle's Orange, and the Mammoth Cluster. The kinds distributed by the Association have not yet become favourites. The light-coloured one (I have forgotten its name) which was sent out about four years ago promised well for the first two seasons, but during the last two seasons it has not fruited as well as the older varieties. The berries were lighter-coloured than Brinkle's Orange, a little larger, and much finer in flavour. The canes, too, were much more productive at first. There was no fruit this season, although the canes seemed healthier than the Philadelphia or the Brinkle's Orange growing near by.

The purple one, one of Mr. Saunders' hybrids, is disliked because of its colour, and also because the berry crumbles so badly while being gathered.

The one distributed in the spring of 1880 is generally reported as making an unusual growth of wood. It has fruited satisfactorily with some persons. I have not yet seen the fruit.

Currants of all kinds, red, white, and black, did well, the crop being above the average.

Gooseberries never fail altogether in this section, and this year the crop has been very good. The kinds generally grown are Houghton's Seedling and Downing. A few persons grow the English Whitesmith, but this variety does not withstand the peculiar treatment usually accorded to gooseberry bushes by most growers in this locality, and is therefore not a general favourite. The practice here is to gather the fruit as soon as *the caterpillars have destroyed the foliage*, which will be when the Houghton and Downing berries are about the size of large peas. Such fruit sells readily *in this market* at from 6 cents to 7 cents per quart, the bushes being allowed to remain without a leaf until the following spring. What wonderful vitality these two kinds must possess to endure such treatment year after year, and continue to yield a fair crop! The Whitesmith, which usually does so well in our rich clay soil, yielded rather below the average this year. It sold readily at from 12 cents to 15 cents per quart.

Pears.—There are but few bearing trees in this neighbourhood, but the quantity produced this season was above the average. A considerable number of pear trees have been planted in this vicinity during the past ten years. Most of them, however, have died, as they were varieties unsuited to this soil or climate. The Flemish Beauty and Clapp's Favourite succeed well, and so will—possibly—a few other varieties; but the present prospects are, that the number of the varieties will be few.

In the southern part of this division, where the pear has hitherto been more successfully grown, the crop was below the average; but the quality—judging by the exhibits at the Cobourg Show Fair made by Mr. Ramsay, Mr. M. Evers, and several others—was equal to the best exhibited at the Provincial Fair. Some 25 or 30 varieties were on the tables, and nearly all first-class samples. Louise Bonne de Jersey, Beurre Gris de Hiver, Beurre Clarigeau, Glout Morceau, Josephine de Malines, Flemish Beauty, Howell,

Duchesse d'Angouleme, White Doyenne, Beurre Hardy, Buffum, Beurre Bosc, Seckel, Lawrence, Easter Beurre, Winter Nelis, Vicar of Winkfield, and many others were exhibited there.

The apple crop throughout this district was below the average, but the samples exhibited at all the fairs were unusually fine. After making inquiries from all parts of this Division, I am pleased to be enabled to add that the codlin moth has done less injury during the past summer than for several previous seasons.

Plums throughout this district have been nearly a total failure. One report from the eastern side of the district gives promise of a "good time coming." Mr. Johnson, of Campbellford, has about 100 plum trees. These trees (like all the plum trees in this section) blossomed freely. Observing great numbers of curculios on the trees at this time, he determined to experiment on a small scale by dusting a few of the trees with air-slacked lime. He selected five trees—two Lombards, one McLaughlin, one Imperial Gage, and one Peach plum. A good sprinkling was applied about the time the bloom was falling. The dose was repeated in about two weeks, and again about two weeks from the time of the second application. The result was, that from these five trees he gathered sufficient fruit for the use of his family, and sold thirteen pails of plums. From the remaining ninety-five trees of the same and similar kinds, and all about the same age, he did not get one bushel.

If the Wealthy apple tree succeeds as well generally as the one Mr. Morris, of Font-hill, sent me two years ago, the Fruit-Growers' Association of Ontario will deserve the thanks of the whole community for disseminating it last spring. This tree of mine, planted in May, 1880, bore several apples this summer. The fruit resembled the Snow Apple in appearance. It was about the same size; rather more round; but the colour was not so brilliant; the flesh was altogether different. It was yellow in colour, of fine texture, with a flavour resembling that of the Spitzenburg. Judging from the experience I have had, I think the tree will very quickly supersede the Snow Apple. It seems perfectly hardy.

All of which is respectfully submitted.

THOS. BEALL.

APPENDIX TO REPORT

OF THE

Commissioner of Agriculture and Arts.

APPENDIX (D).

REPORT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, FOR THE
YEAR 1881.

APPENDIX (D).

TWELFTH ANNUAL REPORT

OF THE

ENTOMOLOGICAL SOCIETY

OF

ONTARIO,

INCLUDING REPORTS ON SOME OF THE NOXIOUS, BENEFICIAL AND
OTHER INSECTS OF THE PROVINCE.

PREPARED FOR THE HONOURABLE THE COMMISSIONER OF AGRICULTURE, BY
THE OFFICERS AND MEMBERS OF THE SOCIETY.

1881.

To the Honourable the Commissioner of Agriculture :

SIR,—In accordance with our Statute of Incorporation, I have the honour to submit to you the Report of the Entomological Society for the year 1881.

The Report includes the audited Financial Statement and the Transactions of the annual meeting for the election of officers and general business, which was held at the City of London on September 24th, 1881. I have also the honour to submit for your approval illustrated reports on the life history and habits of various insects, which have been prepared by members of the Society for the information of the general public, and more especially of those interested in the productions of the soil.

The liberality and fostering care of the Ontario Government during the last twelve years, in aiding our Society by an annual grant, has stimulated the efforts of our practical entomologists, and a reference to the Annual Reports furnished to your Department will show that the Society has faithfully endeavoured to prove of some real benefit to the public interests. The many kind expressions of approval, and the continued courteous support and assistance which we have received from yourself and your predecessors in

the Department of Agriculture have been most cordially appreciated, and I feel assured that the members of the Society will always most cheerfully render the Department all the assistance in their power to promote the interests of the great agricultural community of the Province.

It is a matter of thankfulness that during the past year the country has escaped the serious ravages of any special insect pest.

I have also to report for your information that the Society still continues the regular publication of its monthly periodical—the *Canadian Entomologist*—which has now reached its thirteenth volume.

The library has been largely increased, and the acquisition of a valuable microscope has very materially added to the capabilities of the Society for scientific investigations.

I have the honour, Sir, to remain,

Your obedient servant,

EDMUND BAYNES-REED,
Secretary-Treasurer.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The annual meeting of the Society was held, according to announcement, in their Rooms, Victoria Hall, Clarence Street, London, Ontario, on Monday evening, September 26th, 1881.

A number of those interested in Entomology were present from different parts of the Province—the President, Mr. Wm. Saunders, in the chair. Letters of apology for non-attendance were read from Rev. C. J. S. Bethune, Port Hope; Jas. Fletcher, Ottawa; W. H. Harrington, Ottawa; W. Couper and G. J. Bowles, Montreal.

The Report of the Council was read and adopted, also that of the Montreal Branch, and the Secretary-Treasurer submitted his Financial Report, duly audited, which was also adopted.

ANNUAL STATEMENT OF THE SECRETARY-TREASURER OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, FOR THE YEAR ENDING SEPTEMBER 24TH, 1881.

Receipts.

Balance from previous year, 1880	\$354 80
Members' fees, sale of <i>Entomologist</i> , etc.	294 23
Government grant, 1880	1000 00
Merchandise: pins, cork, etc.	31 38
Sale of Cabinet	4 00
Interest	21 77
Engraving—received for electrotypes of cuts	55 70
	<hr/>
	\$1,761 88

Disbursements.

<i>Canadian Entomologist</i> ; printing, paper, stationery, etc.	\$476 55
Library and apparatus	551 82
Expenses of Report for 1880, including engraving, electrotypes and woodcuts	265 90
Annual vote to Editor and Secretary	150 00
Rent	80 00
Insurance	6 35
Expenses of delegation to A. A. A. S.	32 00
Bookcase for Library	60 00
Sundries: postage, etc.	65 34
Balance	73 92
	<hr/>
	\$1,761 88

We have examined the above with books and vouchers, and found the same correct. Balance in hand, seventy-three dollars and ninety-two cents (\$73.92).

CHARLES CHAPMAN, }
ABRAHAM PUDDICOMBE, } *Auditors.*

London, Ontario.

September 24th, 1881.

REPORT OF THE COUNCIL FOR THE YEAR 1881.

Once again, at the close of another year, it becomes the duty of your Council to report on the state and condition of the Entomological Society of Ontario. It is with pleasure that we feel ourselves able to bear witness to the continued activity, progress, and usefulness of our Society. Our roll of membership is still being constantly augmented by new and valued additions, and the interest in the special work of the Society is more and more widely diffused, not only in our own Province and Dominion, but in the wider circles of the adjoining Republic, as well as in the various countries of the European continent. The publication of the *Canadian Entomologist* is maintained as of yore, and under the able management of its Editor, our worthy President, and with the assistance of its numerous contributors, our periodical continues its useful work of adding to our store of entomological knowledge, and distributing far and wide the results obtained from much hard work and patient observation.

The Annual Report receives the approval of those for whose benefit it is written, and adds an additional proof of the Society's vitality. We are therefore able to state that the work of the Society has been productive of much good, and by its quiet, unobtrusive way has aroused the attention of many whose interests can be materially affected by an acquaintance with the practical results of entomological science. We commend this study to the thoughtful consideration of every farmer, gardener, and fruit-grower, and we feel convinced that the day is not far distant when some knowledge of Entomology will be a necessary part of the education of every tiller of the soil. During the year a large addition has been made to the Library, which now numbers some 550 volumes. Arrangements have been made for a catalogue, and we hope that each succeeding year will add greatly to the number and value of this important property of the Society.

Your Council also availed themselves of an excellent opportunity to procure a valuable microscope, which will be found a most useful adjunct to the Society's rooms, and be of inestimable service in our entomological work.

The Montreal Branch is still flourishing, and their Annual Report will, as usual, be submitted to you.

The London Branch, after due deliberation, decided this year to suspend its operations, and merge its work and membership in the parent Society so long as London was the headquarters of the Society. This has, we are glad to say, been a source of strength to the parent Society. Regular monthly meetings have been kept up, and a greater degree of interest aroused. The audited Report of our financial operations will, as usual, be laid before you by the Secretary-Treasurer.

E. BAYNES-REED,
Secretary-Treasurer.

MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO

The Eighth Annual General Meeting of this Branch was held at the residence of Mr. Geo. J. Bowles, Montreal, on Tuesday, 8th of May, 1881, at 8 o'clock p.m.

The President read the following Report of the Council :

EIGHTH ANNUAL REPORT.

Your Council, at the end of the eighth year since the organization of the Branch, beg to present their Annual Report.

Eight very pleasant meetings have been held during the year, and the interest of the members in the Society has been well kept up. Four new members have been added to the list during the year.

Your Council would record with regret the loss of our indefatigable Secretary, Mr. G. H. Bowles, who in February last removed from this city to reside in Chicago.

The following papers have been read before the Society during the year :

1. "Remarks on *Papilio Breviceauda*,"—By W. Couper.
2. "The Mouth Parts of some Carnivorous and Wood-eating Beetles," with illustrative drawings.—By G. H. Bowles.
3. "Notes on the *Coleoptera* of the Island of Montreal, Part I."—By F. B. Caulfield.
4. "Notes on the Species of *Callimorpha* occurring on the Island of Montreal."—By F. B. Caulfield.
5. "List of *Lepidoptera* taken by Dr. Robert Bell, in 1880, in the North-West Territory."—By H. H. Lyman.

Also a paper by the Rev. T. W. Fyles, entitled, "Advice to Farmers, and How to Deal with the Potato Beetle."

The following works have been added to the Library during the year :

Cassino's Naturalist's Directory for 1880.

The *American Entomologist* for 1880.

Psyche for 1880.

The Financial Statement for the year is herewith submitted.

In conclusion, your Council would record with pleasure the satisfactory state of the Society, and would express the hope that with the accession of new members the work of the Society will be prosecuted during the coming year with even more zeal and perseverance than in the past.

The whole respectfully submitted.

(Signed)

GEO. JOHN BOWLES,
President.

The Report having been adopted, and two new members elected, the meeting proceeded to the election of officers for the year, with the following result :

H. H. Lyman, M.A., President ; W. Couper, Vice-President ; G. J. Bowles, Secretary and Treasurer ; Geo. Bowles, Curator ; Robert Jack, F. B. Caulfield, and Robert Burland, Council.

Two papers were then read, namely: "Notes on Some Species of *Hymenoptera* occurring at Montreal," by F. B. Caulfield; and one "On Instinct in Insects," by G. J. Bowles. The meeting then adjourned, having spent a most agreeable evening.

G. B. PEARSON, JR.,
Secretary pro tem.

The President then delivered his annual address, on the conclusion of which the meeting unanimously tendered Mr. Saunders a vote of thanks, with a request that his address be printed in the *Canadian Entomologist*.

ANNUAL ADDRESS OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

To the Members of the Entomological Society of Ontario:

GENTLEMEN,—While Entomology may be said to deal with small things, the abundance or scarcity of the tiny creatures called insects involves great issues. The truth of this statement has been illustrated forcibly in several directions this year, notably in the case of the Angoumois wheat moth, which has played sad havoc among the stores of corn and wheat in granaries in the South-western States. It is said to have destroyed many thousand bushels of grain, and so widespread has the evil become that it is the opinion of the *New York Sun* that if the Government or the farmers of America could at this time arrest the progress of this insect by expending five millions of dollars, it would be the best investment ever made by the people.

The Angoumois grain moth, *Butalis cerealella* Oliv., is a small moth, the larva of which is very destructive to all sorts of grain. The female lays her eggs on the grain sometimes in the field before it is fully ripened, but more frequently in the bins in the granary. The eggs are of a bright orange red colour, and in a few days there issue from them very minute whitish-coloured worms, scarcely thicker than a hair, which bore into the grain and occupy it, one larva in each kernel. Each kernel contains sufficient food to support one occupant until it reaches maturity, when it changes to a chrysalis within the grain, which, although hollowed and almost entirely consumed within, appears outwardly sound and plump. On pressing between the fingers the grain is found to be soft and yielding, and when dropped into water it floats on the surface.

When the larva is full grown it spins a white silken cocoon, which occupies one end of the cavity within the grain, the other end being filled with the castings of the worm. The moth makes its escape through a small round hole in the side of the grain, which the larva cuts with its jaws before spinning its cocoon. When preparing this orifice for the escape of the future moth, the larva is careful not to cut entirely through, but leaves a thin tissue-like skin unbroken, which the moth finally ruptures when it makes its escape. The body of the moth is about one-third of an inch long, and its wings when spread measure about two-thirds of an inch across; the fore wings are of a plain brownish-buff colour, with a satin-like lustre; the hind wings above and below, as also the under side of the fore wings, are blackish-grey.

This insect is a native of the warmer parts of Europe, and has long been very destructive in France. It was introduced into the southern portion of the United States more than 100 years ago, where it has become fully naturalized. It is often brought into New York in cargoes of grain, but the climate of the Northern United States and Canada appears to be too cold to permit it to thrive amongst us, or to permanently establish itself. It has never yet, to my knowledge, been found within the limits of our Province.

The Chinch Bug, which, although always present in our midst, has happily never yet proved a serious trouble with us, has been very destructive to the corn crop in Missouri and Kansas, and combined with the drought, has seriously affected the yield of this cereal in those States.

The Army Worm has appeared during the season in some portions of the West, and inflicted much damage; and there were good reasons for anticipating trouble from this source in our own Province next year, unless the exceptional drought we have lately experienced, and which has been generally looked upon as an unmitigated evil, should check their natural increase. The Army Worm, in common with many other of our night-flying moths, is double-brooded, but whether the later brood pass the winter in the larval or chrysalis state has never been fully settled. It is probable that with us the bulk of the brood pass the inclement season in the larval condition, the young larva burrowing into the ground for protection during the extreme cold of winter. It has been observed by Entomologists that an unusually wet season, which induces a free growth of vegetation, is very favourable for the sustenance of these pests, and if preceded by a dry autumn, which appears to have the effect of disseminating the moths over a wider area, the worms are often met with in great abundance. During this summer the Army Worm moths (*Leucania unipuncta*), which are always present with us to a greater or less extent, have been unusually abundant in the western portion of our Province. To the sugar-bait, employed by Entomologists to attract night-flying moths, these insects have flocked by hundreds, and this has been observed not only in Ontario, but also in the Western States, showing that this moth has been unusually abundant over an extended district. Millions of their eggs must have been deposited on the leaves and stems of grasses, but the intense drought we have had has probably deprived the newly-hatched larvæ of the food necessary to their existence, and we may hope that the evil we have suffered from in the way of drought has saved us to a great extent from serious invasions of Army Worms next year.

Much attention has been paid of late by Entomologists to the natural conditions which favour or prevent the increase of injurious insects; and I think there is good ground for expecting, after a few more years of close observation, that it will not be difficult to prognosticate, with a large measure of accuracy, several months in advance, the probabilities as to the insect pests likely to prevail during any year in any given district. When this can be satisfactorily accomplished, much practical good may be expected to result therefrom, since by avoiding the planting of such crops as are likely to be especially injured by insect hosts, and growing others comparatively free for the time from these troubles, a large saving may be effected.

During the summer a small moth, well known to Entomologists as a common insect throughout the Northern States and Canada, but never before recorded as destructive anywhere, has invaded the pastures in some parts of Northern New York, and inflicted great injury. It is a species of Crambus, *Crambus vulgivagellus*. The Crambidae are known by the common name of grass moths, from the fact that as far as is known they all feed in the larval state on grass, and hence the moths are found everywhere in meadows, flying about in the daytime, with a short but rapid flight. The moths are small, with narrow front wings, which are usually ornamented with metallic spots and stripes. It was about the middle of May that a serious invasion of what was popularly supposed to be the Army Worm occurred in St. Lawrence County, New York. The State Entomologist, Prof. J. A. Lintner, at once visited the scene of destruction, and found the injury widespread and serious, extending over eight of the northern counties. Hundreds of acres of grass presented a brown appearance, as if winter-killed. A pasture lot of ten acres, which ten days before offered good pasture, was so thoroughly destroyed that in many places not a blade of grass could be seen to the square yard. The upland pastures were first attacked, and entire fields were laid waste in ten or twelve days. Unlike the Army Worm, the caterpillars were seldom seen, and never observed actively feeding, and it was believed by the farmers that they fed at night, or by drawing the blades of grass into their subterranean retreats. In two instances the larvæ were observed in immense numbers collected on the trunks of trees, so that they could have been scooped up by handfuls. The cause of their congregating at these points could only be conjectured; it was not for feeding on the foliage, for the grasses alone are their natural food. The caterpillars were slender, cylindrical worms, about three-quarters of an inch long, of an obscure greenish colour, with shining black heads. They were destitute of lines or other ornamentation, excepting some small, warty spots on their upper

side. Early in August the moths began to appear, when they were identified as specimens of *Crambus vulgicagellus*, the new enemy proving to be an inconspicuous and hitherto unobtrusive little Crambus. It is quite probable that several accounts of injuries to pasture lands in the New England States during the last three or four years by some unknown depredators are to be credited to this species.

At a late meeting of our Entomological Society, held in London, one of our members, Mr. J. M. Denton, referred to the injuries which were at that time being inflicted on some pasture lands within a few miles of London by the larva of the common May Bug (*Lucinosterna fusca*), and exhibited specimens of their work. He had found whole fields of pasture land with the roots of the grass so eaten that the turf could be readily lifted with the hand by the yard, and underneath were thousands of these grubs feeding on the remaining fragments of roots. In one instance, near the village of Delaware, a field had been so completely destroyed that the farmer had set fire to the withered grass with the hope of scorching the enemy to death. As these larvæ readily burrow in the ground when disturbed, he was advised to adopt a different method and turn his hogs into the field to root amongst the grass and devour the larvæ, which they greedily consume in immense numbers. Such wholesale destruction by this insect is not common, but when it does occur it is very alarming.

In the tenth annual report of the State Entomologist of Illinois, just received, mention is made of a new insect injurious to corn. This is a small beetle closely allied to the common striped Cucumber Beetle, and known to Entomologists under the name of *Diabrotica longicornis*. In Illinois the damage caused by the larva of this insect has been considerable. They are small white worms about half an inch long and very slender, which attack the fibrous roots of the corn, and so destroy them that the plants may be pulled up very easily with the hand. After a time the plants begin to wither and the grain fails to mature. In some instances it is believed that the injury inflicted by this tiny creature would result in the loss of fully one-third of the crop. The perfect beetle is about one-fifth of an inch long, with a width scarcely equal to half its length, and of a pale, dull greenish yellow colour without spots or stripes.

The general alarm which prevailed several years ago in reference to the Colorado Potato Beetle seems now to have to a great extent subsided, and notwithstanding that the insect has been very abundant in some sections, it has not been so generally injurious, and where it has appeared in abundance prompt remedial measures have been successfully employed. It has been claimed, and, I suppose, correctly so, that this pest originally came from the canons in the Rocky Mountains, in the State of Colorado, where it is said to have fed on some wild species of *Solanum* growing there. It was my privilege during the latter part of August of this year to spend a week in this district, and while there I travelled fully one hundred miles through those canons. Several species of wild *Solanum* grow in abundance almost everywhere, in the adjoining plains as well as in the canons, and every opportunity was embraced of examining them, but in no instance could I detect any evidence of the presence of the Colorado Potato Beetle in any of its stages. Besides, I saw several potato patches, and these also seemed quite free from any insect trouble. This seemed to me not a little singular in view of the extremely prolific nature of the insect. Can it be that it has migrated so completely as to leave over large areas no representatives behind? or have its natural enemies so increased as to almost annihilate the pest? Our farmers here would, I am sure, gladly hail the advent of either of these agencies should it free them from this troublesome insect.

The question of the use of the most suitable and economical poisons for the destruction of injurious insects still attracts much attention, and Paris Green continues to head the list as the most generally useful, notwithstanding the efforts which have been made by interested parties to replace it by London Purple. London Purple is an arsenical mixture, a waste product, which accumulates during the manufacture of aniline dyes. Before its introduction as an insect destroyer it had no commercial value; on the contrary, the dye makers were at considerable expense and trouble in getting rid of it as it accumulated. Arsenic, which is the active ingredient in this compound, is present in very variable proportions, which is just what one might expect in a waste product. Sometimes it forms less than twenty per cent. of the mixture, while other samples will

contain more than forty per cent. It is associated chiefly with lime and colouring matter. The arsenic present is in a very fine state of division, and intimately mixed with the lime and other ingredients, forming a very fine powder. It is much more soluble than Paris Green, and hence more liable to scorch the foliage, while its very variable strength makes it uncertain in its effects. For these reasons London Purple is not likely to take the place of Paris Green as an insecticide, which, when unadulterated, is nearly uniform in its composition and effects. An artificial mixture of arsenic and lime of uniform strength and coloured could be supplied at about the same price, and would be more reliable than London Purple; but, owing to the more ready solubility of the arsenic in this form and its caustic character, it is apt, unless used with much care, to destroy portions of the tissues of the leaves on the plants to which it is applied, making them appear as if scorched or burnt.

Experiments have been carried on for the past two seasons at the Agricultural College at Lansing, Michigan, by Prof. A. J. Cook, on the use of London Purple as a remedy for the Codling Worm. Early in the summer, while the fruit was quite small, some crab apple trees were syringed thoroughly with London Purple mixed with water, and it is claimed that the poison, which, when the water has evaporated, forms a thin coating on the fruit, either prevents the Codling Moth from depositing her eggs or else poisons the young larvæ as soon as they are hatched, the result being the saving of a very large proportion of the crop from injury, while other trees near by not similarly treated bore very wormy fruit. It is also said that, as the fruit approaches maturity, the most delicate chemical tests fail to show a trace of the poison. I scarcely think that the experiments yet tried in this direction have been sufficiently extended to warrant any general conclusions being based on them; and provided it were proven that this remedy was a certain and safe one, the popular prejudice against applying such virulent poisons directly to the fruit we are to eat would be so strong as to prevent the general use of any such means. Indeed, were it generally known that the apple growers of any district were in the habit of applying arsenic in any form directly to their fruit, it would interfere very seriously with their sales, and it is doubtful if apples so treated would find a ready market anywhere.

It is well known that the seeds of certain noxious weeds will sometimes lie dormant in the soil for almost any number of years, awaiting a favourable opportunity for germinating; but it is not so generally known that the development of insect life is sometimes similarly retarded. It has many times been observed that a few individuals out of a large brood of moths will remain in the chrysalis state over one season and produce the perfect insect the following year, thus remaining a full year more in the dormant condition than is usual; and instances are on record where the perfect insects have escaped after three years spent in this condition of torpor. Recently, Prof. Riley, of Washington, has called attention to a very remarkable case of retarded development in the eggs of the destructive Rocky Mountain Locust, *Caloptenus spretus*. These eggs were laid in 1876, on the grounds of the Agricultural College at Manhattan, Kansas. While grading the ground around the chemical laboratory in the autumn, a quantity of eggs were buried some ten inches below the surface, the covering material being clay, old mortar, and bits of stone, and above this a plank sidewalk. On removing and regrading the soil last spring a number of these eggs were disinterred quite sound and fresh-looking, and when exposed to normal influences they readily hatched; so that these locusts' eggs actually remained nearly four years and a half in the ground unhatched, or four years longer than is their wont. How much longer they would have retained their vitality under favourable conditions of temperature and dryness is unknown. This point has a very practical bearing and deserves further investigation, not only in reference to the eggs of this insect, but to those of all injurious species whose eggs are deposited on or under the ground.

The Sub-section of Entomology of the American Association for the Advancement of Science met this year at Cincinnati, Ohio, where I had the honour of representing our Society. A large number of distinguished Entomologists were present, and many useful papers read and discussions held at the meetings. An account of the proceedings will appear in our Annual Report. It having been decided to hold the next meeting of the American Association in Montreal, I trust that our representative men in all depart-

ments of science will be present to greet with a hearty welcome the distinguished scientists from the United States and abroad who will on that occasion honour the Dominion with their presence. I have strong hopes that the Entomologists of Canada will turn out in good force.

If the progress of a science is to be indicated by its literature and the number of its devotees, then Entomology has made very rapid progress within the last two or three years. There are on this continent now nearly 500 persons pursuing the study of this important branch of natural history, and during the past year a large number of original papers have been published on the subject. The *Canadian Entomologist*, the monthly organ of our Society, continues to hold its place in the front rank among the most useful periodicals in this connection, while clustering around it now are *Psyche*, the organ of the Cambridge Entomological Club; the *Bulletin* of the Brooklyn Entomological Society; and last, though by no means least, *Papilio*, a journal devoted exclusively to lepidoptera and mainly to descriptions of new species, which has now completed its seventh number. All these are devoted exclusively to Entomology, and will be found of great value to every Entomologist. To these must be added the valuable reports of the U. S. Entomological Commission, whose good work is still being continued; the annual reports of the Entomologist of the Department of Agriculture at Washington, those of the several State Entomologists, the annual report of our own Society, as well as a large number of papers on the subject to be found in the Transactions and Proceedings of all Natural History Societies. There has also appeared in the *Canadian Sportsman and Naturalist*, edited by William Couper, of Montreal, some Entomological items of special interest to Canadian Entomologists.

In my last annual address I referred to the appointment by the Ontario Government of a Special Commission to enquire into the agricultural resources of the Province, and the progress and condition of agriculture therein. In view of the important bearing of Entomology on successful agriculture, the Government was pleased to appoint your President as one of the Commissioners. The report of the Commission has since been compiled and published, in which the insects injurious to the farmer and fruit-grower have been fully dealt with; also the remedies suggested for their destruction, and the beneficial insects which prey upon them. The evidence relating to the subjects of insects and insectivorous birds occupies 104 pages in the full report, and 61 pages in the condensed report, both of which are adorned with many excellent illustrations. The eagerness with which these publications have been sought after is indicative of the estimation in which they are held by the public. It would, I think, meet a strongly felt want if some arrangement were made whereby this valuable work, so useful to every farmer, might become accessible by purchase to all who are seeking for it throughout the length and breadth of our Dominion.

I have the honour to be,

Yours very sincerely,

WM. SAUNDERS.

The election of officers then took place, when the following gentlemen were declared duly elected:—

President.—Wm. Saunders, London.

Vice-President.—G. J. Bowles, Montreal.

Secretary-Treasurer and Librarian.—E. Baynes-Reed, London.

Council.—Rev. C. J. S. Bethune, Port Hope; J. A. Moffat, Hamilton; James Fletcher, Ottawa; R. V. Rogers, Kingston; J. M. Denton, London; W. H. Harrington, Ottawa; and W. Couper, Montreal.

Editor.—Wm. Saunders.

Editing Committee.—Rev. C. J. S. Bethune, J. M. Denton, E. Baynes-Reed.

Auditors.—Chas. Chapman, H. Bock.

The report of the Montreal Branch was next read.

Routine business having been transacted, the Chairman invited discussion on any Entomological matters.

POTATO BEETLE.

Prof. J. T. Bell, of Belleville, remarked that he had found the Potato Beetle feeding in his neighbourhood on the "Bittersweet," *Solanum dulcamara*.

Mr. Saunders stated that during his recent visit to Colorado, although he travelled much over the plains and through the mountain canons, he found no traces of this insect in any of its stages.

Mr. Chas. Arnold, of Paris, said that in his section the Colorado Beetle, after having devoured the potato vines, attacked the tomato plants.

Mr. P. C. Dempsey, of Trenton, stated that he had preserved his tomato vines from injury by the beetle by the free use of Paris Green on his potato plants.

Mr. J. A. Moffat, of Hamilton, stated that he had observed serious injury to be caused to the young plants by the beetle.

Mr. Saunders reported that *Lebia grandis*, one of the beneficial insects which devour the larvæ of the Colorado Beetle, had been found by him in greater numbers than usual, and that he had taken a number of specimens at night while sugaring for moths. Mr. Moffat had also observed it to be common near Hamilton, on the Golden-rod *Solidago*.

COTTON WORM.

Mr. Jas. Fletcher had written to ask if any member had made any observations during the year on the moth of the Cotton Worm, *Aletia argillacea*, in reference to which an interesting discussion took place at the last annual meeting.

Mr. Moffat reported having captured several specimens, and Mr. Reed had observed their frequent occurrence, attracted by light in the house at night during September.

CABBAGE BUTTERFLY.

Mr. Saunders reported that as far as he could ascertain, the extreme western limit of this insect did not at present exceed 100 miles west of Chicago.

Prof. Bell stated that he was of opinion that in the neighbourhood of Belleville the common English sparrow had proved useful in destroying the larvæ of this butterfly.

The chairman, Mr. Saunders, remarked that this was contrary to the experience of all those who had made a special study of the habits of this sparrow, and enquired whether the Professor had ever examined the crop of the bird for evidences of the presence of this larva, to which the Professor replied in the negative.

A RARE BEETLE.

Prof. Bell exhibited several specimens of *Alaus gorgops*, one of which he had captured near Belleville; and showed the peculiar points of difference between this insect and our common Eyed Elater, *Alaus oculatus*.

NEW CLOVER INSECT.

Mr. Wm. Weld, editor of the *Farmer's Advocate*, said that he had lately read in several American papers accounts of the ravages of a new clover insect; that specimens of clover heads had recently been sent him by several correspondents, infested with an insect which he believed to be this new species; and asked whether any of the Entomologists present could give him any information as to where it had occurred, and the amount of damage it was likely to cause in this Province.

Mr. Arnold thought, from what he had heard from those growing clover in his vicinity, that this insect was injuring the crop there. Mr. Saunders said that the insect had not yet come under his observation, and that he would be very glad to receive specimens from any person who should find them in this Province.

The insect referred to is the Clover Midge, *Cecidomyia leguminicola*, a small fly which in its larval state devours the ripening seeds in the clover heads.

PEA BUGS.

Mr. Weld also inquired as to the experience of those present as to the ravages of this pest during the year.

Mr. Arnold said that the Pea Bug had committed more damage this year in his neighbourhood than ever before. Some friend had recommended him to enclose a piece of camphor in the bags of seed peas with a view of destroying the insect; this he had tried, and found useless. Mr. Gott, of Arkona, had not found the beetles so plentiful this year as usual. The subject was discussed at some length, and the general opinion expressed that the most feasible remedy was to cease growing peas for a time in any district where the insect had proved seriously destructive, and thus starve them out.

THE MAPLE TREE BORER.

Prof. Bell remarked that he had found this borer, *Clytus speciosus*, not nearly so common as formerly. Mr. Saunders said that he believed it to be increasing in the neighbourhood of London, and that some of the street trees had been seriously injured by it; he also referred to the depredations of another maple borer, *Aegeria aceris*, a small moth whose larva burrows under the bark of the Red Maple, *Acer rubrum*, and in season was quite common on the trunks of the maple trees on our streets. Mr. Reed also reported the maples round his house being much infested by this pest, the empty cocoons being found protruding from the trunks of the trees in quantities during the summer.

A discussion then ensued on the probabilities of new insect pests being introduced from abroad by the importation of grains, seeds and trees, in which several of the members took part. Mr. Weld urged that the Society should call the attention of the Government to the necessity of taking every possible precaution to prevent the introduction of such insects. The President remarked that in his official capacity he had, through the Provincial Agricultural Association, already brought this matter before the Government, and that some steps in this direction had been taken.

The meeting then assumed an informal character, and the members were shown by Messrs. Saunders, Denton, and Reed many of the more interesting specimens in the Society's large collections, and also exhibited microscopic specimens illustrating the structure of insects. The valuable library of the Society was also examined by the members, and added to the interest of the gathering.

After enjoying a very pleasant and profitable evening, the meeting adjourned.

MEETING OF THE SUB-SECTION OF ENTOMOLOGY OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The meeting of the American Association for the Advancement of Science was held at Cincinnati, Ohio, commencing at 10 o'clock a.m. on Wednesday, the 17th of August, 1881. At the conclusion of the opening exercises the several Sections proceeded to organize, when the Sub-section of Entomology was called to order by the President, Rev. J. G. Morris. A large number of Entomologists were present, among others C. V. Riley, Washington; Cyrus Thomas, Carbondale, Ill.; Wm. H. Edwards, Coalburgh, W. Va.; J. A. Lintner, Albany, N. Y.; Rev. J. G. Morris, Baltimore, Md.; Wm. Saunders, London, Ontario; E. W. Claypole, Yellow Springs, Ohio; Miss M. W. Brooks, Salem, Mass.; B. Pickman Mann, Washington; C. D. Zimmermann, Buffalo, N. Y.; A. J. Cook, Lansing, Mich.; J. D. Putnam, Davenport, Iowa; S. H. Peabody, Champaign, Ill.; V. T. Chambers, Covington, Ky.; and Chas. Drury, Avondale, Ohio.

On Thursday, August 18th, the Sub-section of Entomology met at 2.30 p.m.

The first paper read was by Prof. C. V. Riley, on Retarded Development in Insects. In this paper the author recorded several interesting cases of retarded development in insects, whether as summer coma, or dormancy of certain portions of a given brood of caterpillars, the belated issuing of certain imagines from the pupa, or the deferred hatching of eggs. One of the most remarkable cases of this last to which he called attention

was the hatching this year of the eggs of the Rocky Mountain Locust or Western Grass-hopper, *Caloptenus spretus*, that were laid in 1876 around the Agricultural College at Manhattan, Kansas. These eggs were buried some ten inches below the surface in the fall of 1876 in grading the ground around the chemical laboratory, the superincumbent material being clay, old mortar and bits of stone, and a plank sidewalk above this.

In removing and regrading the soil last spring, Mr. J. D. Graham noticed that the eggs looked sound and fresh, and that they readily hatched when exposed to normal influences: the species being determined by Prof. Riley from specimens submitted by Mr. Graham. Remarkable as the facts are, there can be no question as to their accuracy, so that the eggs actually remained unhatched during nearly four years and a half, or four years longer than is their wont. This suggests the significant question: how much longer the eggs of this species could, under favoring conditions of dryness and reduced temperature, retain their vitality and power of hatching?

Putting all the facts together, Prof. Riley concludes that we are yet unable to offer any satisfactory explanation of the causes which induce exceptional retardation in development among insects. The eggs of Crustaceans, as those of *Sepus* and *Cypris*, are known to have the power of resisting drouth for six, ten or more years without losing vitality, while in some cases they seem actually to require a certain amount of desiccation before they will hatch. Yet the fact remains that different species act differently in this respect, and that individuals of the same species, under like external conditions of existence, act differently; that temperature, moisture, food, etc., do not influence them alike. We can understand how this great latitude in susceptibility to like conditions may, and does in the case of exceptional seasons, prove beneficial to the species by preserving the exceptional individuals that display the power to resist the usual changes.

The next paper was by the same author, on New Insects injurious to American Agriculture, in which attention was called to several insects hitherto unknown as injurious, which during the present year have proved very destructive to one crop or another. Such hitherto unknown and unreported injury is either caused by—1st, imported species; 2nd, native species previously known, but without destructive habit; 3rd, unknown or undescribed species.

Mr. W. H. Edwards then read a paper on certain habits of *Heliconia charitonia*.

Some interesting discussion followed the reading of these papers, after which an informal discussion on Entomological subjects took place, in which many of the members joined. The meeting then adjourned.

On Friday, at 11.30 a.m., the Entomological Sub-section held another session.

The first paper, "On the Length of Life of Butterflies," was read by W. H. Edwards, followed by one on the Life Duration of the Heterocera, by J. A. Lintner, both of which will appear in the pages of the *Entomologist*.

A few remarks were made by C. V. Riley on his own extended observations on the duration of the lives of both butterflies and moths, indicating that they were, as a rule, of very short duration.

Cyrus Thomas stated that according to his observation the Army Worm, as a caterpillar, a chrysalis and a moth, existed in all seventy-seven days. Some observers had, however, made it seventy-six, others seventy-nine days. He contended that in confinement, in a proper temperature and with ample food, the Army Worm passed through its metamorphosis more quickly than in natural conditions.

B. P. Mann disagreed with Mr. Thomas on this latter; so also did C. V. Riley, it being contrary to their experience.

J. A. Lintner, State Entomologist of New York, then read a paper on "A Remarkable Invasion of Northern New York by a Pyralid Insect."

He said that about the middle of May, of the present year, a serious invasion of St. Lawrence County, N. Y., and several of the adjoining counties, by the "Army Worm" was announced. It was stated that many pastures had been completely ruined, and the entire destruction of the pastures and meadows was threatened. Not having witnessed the operations of the Army Worm, he at once visited the infested locality. The reports had not been exaggerated. The injury was widespread and serious, already extending over eight of the northern counties. Hundreds of acres of grass presented a brown

appearance, as if they had been winter-killed. A pasture lot of fifty acres, which ten days before offered good pasture, was burned so that in places not a blade of grass could be seen to the square yard. Numerous dead caterpillars were adhering to the dead stems of last year's grass, which it was believed had fallen victims to starvation. The upland pastures were first attacked. The progress was remarkably rapid; entire fields were laid waste in ten or twelve days. The secrecy of the depredations was remarkable. The larvæ had seldom been seen, and never observed in active feeding. It was believed by the farmers that they fed at night, or by drawing the blades of grass into their subterranean retreats. In two instances the larvæ were observed in immense numbers, collected on the trunks of trees, so that they could have been scooped up by handfuls.

The tree trunks were enveloped by a firm web of silk, spun by the caterpillars, of so firm a consistence that it could be lifted up in a sheet like a piece of woven silk. The cause of the congregation at this point could only be conjectured. It was not for feeding on the foliage, for the grasses alone were eaten by the caterpillars.

The caterpillars observed and collected by Mr. Lintner were slender, cylindrical forms, sixteen footed, of an obscure greenish colour, with a shining black head. They were destitute of lines or other ornamentation, except some warty spots on their upper side. Their average length was three-fourths of an inch. He was unable to identify them with the Army Worm, for they were quite unlike the mature form of that species, and their habits seemed to be quite different.

On the 6th of August the first moth emerged from some cocoons furnished by Mr. J. Q. Adams, of Watertown, N. Y., and it turned out to be a *Crambus vulgivagellus*.

The interesting question as to which of our insect depredators was chargeable with the ravages in Northern New York was decided. The new enemy was found to be an inconspicuous, hitherto unobtrusive little *Crambus*. It had long been known in our cabinets, but had never before presented itself as an injurious insect.

It is probable that several accounts of injuries to pasture lands in New England States during the last three or four years, which have been ascribed either to the Army Worm or an unknown depredator, are due to this species. Its subsequent appearance may hereafter be recognized.

The Crambide are small moths with narrow front wings often marked with metallic spots and stripes, which are frequently driven up for short flights in our pastures and meadows during the fall months. Specimens of the larvæ, pupæ, cocoons and perfect insects were exhibited to the Section.

Following this three papers were read by A. J. Cook, of Lansing, Mich., "How Does the Bee Extend its Tongue?" "The Syrian Bees," "Carbolic Acid as a Preventive of Insect Ravages."

The author explained how the bee extends its tongue by means of a diagram; it is done, he believes, by forcing into the extremity of that member some of the fluid contained in the glands. In his paper on Syrian Bees, he related how D. A. Jones, of Canada, and Frank Benton, of Michigan, went to Europe in search of new varieties of bees. They brought from Cyprus both the Cyprian bee and the Syrian bee, and Mr. Benton went to Ceylon and Java in search of other varieties. From the former place he brought two new species not very unlike our own, but in Java he failed to find the great Java bee. With the Syrian bees the author had Syrianized the apiaries of the Michigan Agricultural College. The Syrians are of a yellow type, closely allied to the Italian bee; they are indefatigable workers, but more irritable than other bees, especially when queenless. They are undoubtedly a valuable acquisition to American apiculture.

The next paper was by Mr. W. H. Edwards, on "The Alleged Abnormal Peculiarity in the History of *Argyrois myrina*," which was followed by one by E. W. Claypole, of Yellow Springs, Ohio, on the Buckeye Stem Borer. The writer remarked that during the spring months some of the leaves of the Buckeye tree droop and die without any obvious cause; indeed these dying leaves may be seen almost as soon as the foliage is expanded. On examination, a small hole was discovered in every stalk on which a dying leaf was found, and in splitting this round stalk a living caterpillar was observed ensconced in the narrow tunnel evidently excavated by itself. The destruction of the central part of the leaf stalk was clearly the cause of the death of the leaf. A number of leaves were

collected and the larva reared in confinement, producing a small moth closely resembling *Sericoris instrutana*. When or where the egg is laid has not been discovered. The young larvæ may be found in the leaf stalks of the Buckeye tree from the 2nd to about the 8th of May. After spending a few days in this secure retreat, it comes out and dwells for the rest of its caterpillar life in the dying leaf at the top of the stem upon which it feeds; after thus feeding for about a fortnight it passes into the chrysalis state, from which in about ten days more it emerges a moth.

The President then read his annual address.

PRESIDENT'S ADDRESS.

GENTLEMEN,—I regret exceedingly that I am compelled to begin my address by the recital of a melancholy event in the history of our Section.

About ten days after our adjournment last year, and after probably we had all arrived at home and settled down to our autumn's work, the distressing intelligence reached us of the sudden death of one of our most honoured and distinguished members. He had mingled with us at Boston and had taken part in our deliberations, and though cheerful and full of hope, yet his usually buoyant temperament was plainly mellowed by advancing years, the every-day anxieties of life, and the pressure of severe intellectual pursuits. He returned home after our adjournment and immediately resumed his linguistic studies with his usual incessant ardour, for he often said to me: "I never take exercise when I am at home, but work all day and sometimes late into the night," and on the 1st of September, 1880, Samuel Stehman Haldeman was suddenly stricken down. His lamented death has been noticed in most of the leading papers and scientific journals of the country, accompanied with some biographical facts, for he was widely known as a scholar and a scientist, and no man was more highly esteemed as a companion and gentleman. We all are aware of the distinction he achieved in letters and science in our own and foreign countries, of the learned books and papers he has written, and of the titles and prizes which his works secured for him.

If this were the proper place, it would be pleasing to dwell, even at length, upon the many valuable traits of his character, the vast extent of his diversified acquirements, and his almost unparalleled qualities as a friend and scientific fellow-labourer. I feel as if I were announcing the death and reciting the admirable virtues of a brother. For forty years he and I were what may properly be called "bosom friends." In early life we were engaged in similar scientific pursuits, and living but a few hours' distance from each other, our mutual visits were frequent, and our warmest friendship and confiding intercourse continued uninterrupted to the end.

It is well known that in early life he devoted much of his time to our favourite science, to which he made some valuable contributions. His principal papers are: Materials toward a History of Coleopterous Longicornia of the U. S.; Corrections and Additions to this paper; Description of N. Am. Coleoptera; Cryptocephalinorum Borel. Am. Diagnosis. These papers give evidence of honest and painstaking research, patient analysis and sharp discrimination, and are profitably consulted by investigators of the present day.

Of late years he had turned his attention particularly to the study of language, and became a distinguished member of the Philological Society. All readers know the celebrity he attained in that department, and the ardour with which he pursued those studies; but notwithstanding their engrossing attractions, he never ceased to feel an interest in everything that concerned our department. It is hard for a man to forget his first love.

Thus much I thought it proper to say of the lamented Haldeman. He was no ordinary man, whom you might compliment with a passing respectful obituary notice. In science and letters he was a great man. His memory will be long cherished by admiring friends. "*Idem extinctus amabitur.*" It may not be out of place to mention here one fact to me, at least, personally interesting. Less than two months ago the monument of Haldeman, chiselled out of enduring granite by Strecker, a brother Entomologist, was

erected over his grave by the pious care of the skilful artist himself, who spends his days in cutting marble and granite into classic forms, and half of his nights in studying and figuring the butterflies of his own unequalled private collection.

Gentlemen, forty years ago I could count the known working Entomologists of our country with the first ten numerals. The older Melsheimer, who may properly be designated as the father of our science in this country, Say, Peck, Gould, Randall, Peale, and a few other pioneers, had died or retired, and the only workers then were Harris, of Cambridge; Major LeConte and his son John L., of the city of New York; Fitch, of the State of N. Y.; Haldeman, Melsheimer, jr., and Zeigler, of Pennsylvania, and a few others of no special note, were the only ones, as far as is at present recollected, who prosecuted our science with any zeal, and who contributed to its progress by the descriptions of species. There were others who collected insects, but they made no claim to be scientific Entomologists. I remember distinctly when Melsheimer, Haldeman, Zeigler and I used to meet several times a year at our respective homes to read papers, discuss questions, exhibit new species, recite our Entomological adventures, and then adjourn to a well-appointed table. We regretted that we had no collaborators within two hundred miles, for the LeContes, in New York, were our nearest neighbours. In that day there was not a man in Philadelphia who studied insects. We then established "The Entomological Society of Pennsylvania," and after electing all our confreres in this country as honorary members, we had the audacity to confer the same distinction upon some great men abroad, whose letters of grateful acceptance indicated that they thought that the Society was something more than a club of four comparatively unknown men meeting in Haldeman's study on the banks of the Susquehanna!

And now look at the mighty change. In the Naturalist's Directory for 1880 there are no less than 436 names reported as pursuing our science. Now, whilst it is true that many of these may be collectors only, still they are more or less useful. They all must be interested in it to a greater or less extent, or they would not have reported themselves as such. Be this as it may, the increase is simply wonderful and very encouraging. Doubtless there are numerous others in the country engaged in the same delightful employment whose names do not appear in the Directory.

There is no other distinct branch of science that has so many representatives in that book as ours, excepting Botany and Geology, and in Zoology specially we are ahead of the Ornithologist by over 50; the Conchologist are fewer than 100 all told, and all other specialists in Zoology are behind us. All this is cheering, and we are sure that the number of collaborators is growing every year.

But there is a still more encouraging view of the subject, which is founded not only on names, but on facts, and I am sure it will gratify the Section to hear of the number of the published contributions of our fellow-workmen. True, they are not all members of this Section, but they belong to the family, and we hail them as brethren of the same household.

Most of us have, of course, kept our eyes upon the various journals, and have been pleased to see so many papers, and yet perhaps few of us have any proximate conception of their number and variety. Hence I have thought that probably the most acceptable contribution I could make at this meeting would be a complete list, as far as was possible, of all American Entomological writers since our meeting in August last, and this I have done and will present it at the proper time. Some names may have been inadvertently omitted, but these can be subsequently introduced. In order to insure perfect accuracy and fullness, I made the list of each author's writings as far as I could find them and sent it to him for correction, and I here desire to thank those gentlemen for the uniform courtesy with which they granted me their aid.

This paper will give us a better idea of the progress of our science during the past year than any other mere description possibly could.

A brief analysis of it gives 77 writers and 302 titles; 25 of these articles treat of Coleoptera; 19 of Lepidoptera; 15 of Orthoptera; 5 of Neuroptera; 10 of Diptera; 11 of Hymenoptera; 11 on Hemiptera; 8 or 10 describe larvæ of various orders; 5 or 6 are on fossil insects; a few on Myriopods and Spiders, and 11 on Economic Entomology.

This brief exhibit will give an idea of what has been done as far as has been made

public. Doubtless there are many other papers in preparation, and much efficient work has been privately done which may never be published.

It would be out of my province to specify any of these writings in this address, and much more to express any opinion of their relative value, or to indulge in any critical remarks. That must be left to the reviewers.

We now have four journals exclusively devoted to our science, and in several others considerable space is allotted to it. In connection with these must be mentioned the annual reports of the State Entomologists. The Proceedings and Transactions of all Natural History Societies also contain frequent articles upon the subject.

The Canadian Entomologist, *Psyche*, *The Bulletin* of the Brooklyn Entomological Society, and *Papilio*, should be supported by every one of us. Indeed, no man can know how our cause is advancing without them, and as it is likely that none but Entomologists read them, so much the more general should be our patronage that they may be maintained.

Each of these four seems to occupy its peculiar field. *The Canadian* is general, and the organ of a special association. Although it is geographically *extra limitas*, yet it is very near to us, and a large share of its original papers come from this side of the Niagara. We claim it as one of our own, and being the oldest and admirably conducted, we hope that its present efficient editor may long continue to conduct it and render it still more interesting and instructive.

The next oldest is *Psyche*, and in relation to it I may quote what our first President said in his opening address: "*Psyche*, though small, is indispensable to every one occupied with the insects of North America." It covers a ground not occupied by any other periodical in the world, and is very creditable to the disinterested labours of American Entomologists. Its accuracy has never been questioned, and it is extremely desirable to secure its continuous publication. You know that it was begun by the Cambridge Entomological Club, which is really the parent of the Club of the A. A. A. S., which has now been elevated to the dignity of a Sub-Section. The Cambridge Club differs from some others in the country in freely granting the use of its library to Entomologists throughout the whole country, and hence it is very desirable that the library should be enriched and the Club thus enabled to extend its benefits still more widely.

The Bulletin of the Brooklyn Entomological Society is a spirited publication, displaying much zeal, correct diagnosis and careful description.

Papilio, the youngest of the family, is entirely devoted to Lepidoptera, and thus occupies an exclusive field and cultivates it successfully. The necessity for it arose, I apprehend, from the fact that our investigators had so much that was new to publish, that room could not be found in the other journals; and when we consider that the number of our writers is increasing every year, and new discoveries are constantly made, it is plain that all the journals now in existence among us could not publish all the communications unless the journals were greatly enlarged. As it is likely that all these editors render their valuable services gratuitously, and that the present patronage would not justify an enlargement, we shall have to be content for some time to come with their present size.

It is much to be regretted that it was deemed necessary by the editor of the *American Entomologist* to suspend its publication in January last. We have all derived instruction from its pages, but whilst we shall not hereafter have its monthly greetings as a distinct journal, there is some compensation in the fact that the department it so ably represented has been transferred to the *American Naturalist*, in which we discern evidences of the same talent which distinguished it under its previous form.

In conclusion, I will make bold to throw out one or two suggestions.

1. In view of the wonderful progress which our science has made in this country, has not the time come for condensed, complete, systematic books on each of the Orders, after the style of many German books that might be mentioned? Every one of us is often asked by beginners: What book would you recommend on beetles? And our answer is: There is none which contains descriptions of all our known species in systematic order, but you must gather them from various monographs, journals and proceedings, which are not easy to procure. This disheartens the young student. The same is to a great extent

also true of butterflies, especially of *Noctuidæ* and of other orders of insects, although the want is supplied in *Lepidoptera* more fully than in any other. But even this order, beyond the Diurnals, although hundreds of species are described, has not been brought together in systematic arrangement. The material is at hand, and nothing is wanting but a competent editor and an accommodating publisher to bring out a series of works which would contribute immeasurably to our progress.

My second suggestion is, that it would be interesting to know the extent, character and condition of the larger public and private collections in the country, with a mention of the varieties they contain. This might embrace two sections, those of our own species and those of foreign countries. A paper on this subject for the next meeting would be an interesting contribution, and I hope some gentleman will furnish it; or let some member be appointed, so that there may be no conflict, and the whole field be open to him. No doubt the owners of private collections and the curators of public ones would cheerfully render him their counsel and aid.

And now, gentlemen, congratulating you upon our meeting again, let us proceed to our business and prosecute it with vigour, patience and order.

JOHN G. MORRIS.

At the conclusion of the address a vote of thanks was tendered to the President, coupled with the request that the copy be sent to the *Canadian Entomologist* for publication, which was kindly assented to.

On Saturday morning the Entomological Sub-section was again in session, when the following papers were read:

The Egg Case of *Hydrophilus triangularis*, by C. V. Riley; on the Oviposition of *Prodoxus decipiens*, and also one on the Cocoon of *Gyrinus* by the same author. Following these a paper was presented by B. P. Mann, entitled Suggestions of Co-operation in Furthering the Study of Entomology; and another by C. V. Riley, on New Insects Injurious to American Agriculture.

In this latter paper the author called attention to several insects hitherto unknown as injurious, which during the present year have proved very destructive to one crop or another. Such hitherto unknown and unreported injury is either caused by, 1st, imported species; 2nd, native species previously known but without destructive habit; 3rd, unknown or undescribed species. The author gave an account of the injury which had been done to clover plants by a beetle, *Phytonomus punctatus*, in Yates Co., New York. The cocoons of the beetle were found on the ground in the fields, but the beetles were difficult to find on account of their shyness, as they fall to the ground when approached. Mr. Riley also reported that much injury had been done to corn in South Carolina and Georgia by a borer which was probably the larva of a Pyralid moth.

After the reading of papers an informal discussion on Entomological subjects took place.

Mr. A. J. Cook remarked that *Heliothis armigera* had attacked corn in Michigan for the first time in 1880. That was a very wet year, whereas this year had been very dry, and this season the army worm, *Leucania unipuncta*, had been observed injuring it for the first time.

Mr. W. Saunders said that the imágos of the army worm, *Leucania unipuncta*, had been unusually abundant in Ontario during the summer, and had been seen at sugar in great numbers, and referred to the fact that the destructive brood of this insect was not the first brood. Mr. Cook had found the moths similarly abundant in Michigan.

Mr. Cyrus Thomas stated that he had positive proof that the eggs of *Leucania unipuncta* had been deposited in fields of oats. He also said that wet weather was very favourable for the development of this insect.

Mr. J. A. Lintner spoke of the great abundance of the clover-seed midge, *Cecidomyia leguminicola*, which was rapidly spreading over a large area. Mr. B. P. Mann considered that the rearing of insects in the house tended to prolong the life of the larvæ, and to

shorten that of the pupæ. Mr. C. V. Riley agreed with him, but Mr. Thomas held the opposite view.

Mr. S. H. Peabody, speaking of the duration of life of some moths, remarked that in *Endropia* and in *Ctenucha virginica* the period of existence of the imago was short.

Mr. Riley said that *Anisota rubicunda* feeds on both the hard and soft maple trees, and that the colouring of the imago in the western limits of the region where the moth is found is very pale in colour. Mr. J. A. Lintner stated that he had captured this insect at Schoharie, N. Y., having a yellow colour with only a slight tinge of rose.

Mr. W. H. Edwards remarked that he had found *Thecla henrici* only in April. It feeds on the wild plum tree. The larva eats into the unripe plums, burying its head and shoulders in the fruit, and eats no other kind of food. The larva becomes full grown by the time that the plum has become half grown. The insect has but one brood in the year. Mr. Edwards also remarked that *Lycaena violacea* feeds upon many different food plants.

The meetings of the Entomological Sub-section were throughout very interesting and profitable, and the "brethren of the net" separated with regret, the hope being expressed by all that they might be privileged to meet again next year in Montreal.

POPULAR PAPERS ON ENTOMOLOGY.

ENTOMOLOGY FOR BEGINNERS.

THE SATELLITE SPHINX—*Philampelus satellitia* (Linn.).

By WM. SAUNDERS, LONDON, ONT.

This is one of the most beautiful of our Sphinx moths, a rare as well as lovely creature, and an object highly prized by collectors. It is found throughout the northern United States and occasionally in Canada, but is nowhere very common.

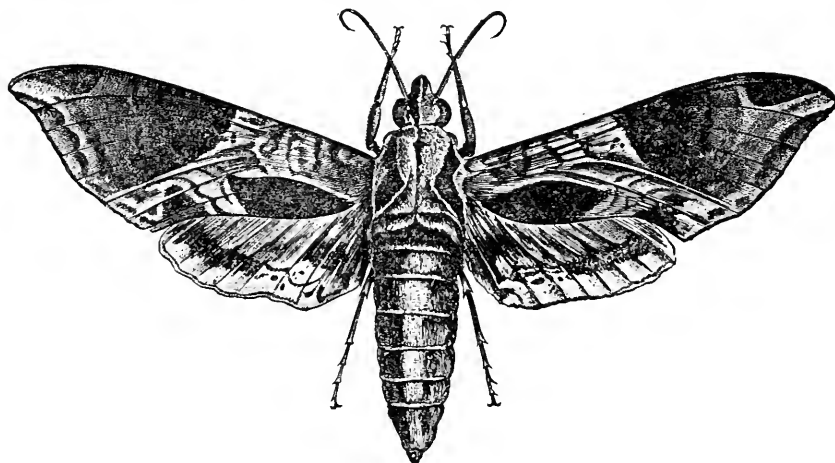


Fig. 1.

The moth (fig. 1), when its wings are expanded, will measure from four to four and a half inches across. Its colour is of a light olive mixed with gray and varied with patches of a darker olive-green, rich and velvety, and some portions with a rosy hue. The moths appear in July, when, after pairing, the female deposits her eggs singly on the leaves of the grape-vine or Virginia creeper (*Ampelopsis quinquefolia*), where they shortly hatch

into small green larvæ of a pinkish hue along the back and with a very long pink horn at the tail. As the caterpillar increases in size the tail becomes shorter, and after a while

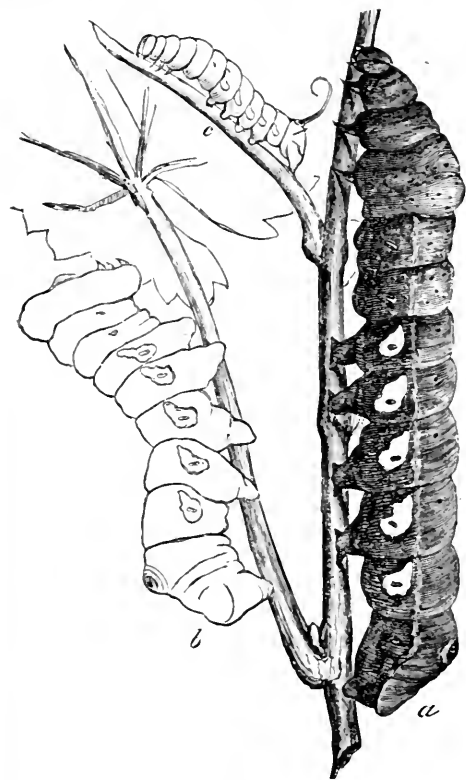


Fig. 2.

curves round, as shown at *c* in fig. 2. As the larva approaches maturity it changes to a reddish-brown colour, and after the third moult entirely loses the caudal horn, which is replaced by a glassy eye-like spot. The mature larva when in motion, as shown at *a*, fig. 2, will measure nearly four inches in length, but when at rest it draws the head and two adjoining segments within the fourth, as shown in the figure at *b*, which shortens its length nearly an inch, giving it a very odd appearance with its anterior portions so blunt and thick. It is of a rich reddish brown colour, of a lighter shade along the back, with five or six nearly oval cream-coloured spots along each side from the fifth to the tenth segments inclusive; sometimes the spot on the fifth segment is indicated by a dot only, in other instances entirely wanting. On the anterior segments there are a number of black dots; a dark polished raised eye-like spot in place of the tail; stigmata black, showing prominently in the cream-coloured spots along the sides.

It is a very voracious feeder, and where present strips the vine so rapidly of its leaves that it soon attracts attention. When full grown it descends and buries itself in the ground, where it forms an oval cell, within which it changes to a chrysalis.

The chrysalis is of a chestnut brown colour, with the segments roughened with impressed

THE INDIAN CETONIA (*Euryomia inda*).

This is a stout, hairy beetle (fig. 3), which makes its appearance early in spring, usually towards the end of April or beginning of May, flying about in open fields and about the borders of woods, with a loud buzzing sound resembling that of a bumble bee. It belongs to the flower beetles, most of whom live on pollen and the honey of flowers, and are fond of sweets.



Fig. 3.

This insect is of a brownish-gray color, dotted and spotted with blackish and thickly covered with short greenish-yellow hairs. It measures half an inch or more in length. During the summer it disappears, but a second brood comes out in the fall, usually during September, when they may be found feeding on the pollen of flowers and also upon the sweet sap of plants and trees. Not content with this, they attack our finest and most luscious fruits, eating their way into the richest ripening pears and burrowing into the finest peaches so deeply that only the tips of their bodies are visible, and in this way spoiling the fruit and inducing rapid decay. They also attack grapes and other sweet fruits.

THE LEGGED MAPLE BORER—*Aegeria aceris* (Clemens).

In 1860 Dr. Clemens described this pretty moth in the Proceedings of the Academy of Natural Sciences, Philadelphia, and since then it has been written on by Mr. P. Gemmadius in the *American Naturalist* for January, 1874, and in the same year by C. V. Riley, in his 6th Missouri Report. It is well figured in the accompanying cut, figure 4 (after Riley), in all its stages; *a* shows the larva, *b* the cocoons exposed by removal of the bark, *c* the moth, and *d* the chrysalis.

The moth appears late in May and during June. When the wings are expanded it measures about three-quarters of an inch across; its wings are transparent, decorated with bluish-black markings. The head and palpi are of a deep reddish-orange, antennæ bluish-black, thorax ochreous yellow, abdomen bluish-black varied with ochreous yellow and terminated by a tuft of brilliant reddish-orange hairs.

The under side of the body is ochreous-yellow, with bluish-black markings.

The female deposits her eggs on the bark of the soft and sugar maple trees, chiefly on the former, and when hatched the young larvæ burrow through the bark and feed upon the inner portion and sap wood, never penetrating to the solid heart wood. The excavations made by the larva are filled with its brown castings. When full grown it is more than half an inch long, cylindrical to the eleventh segment, then tapering to the end, with the skin wrinkled and folded. The head is small, of a yellow colour, cervical shield paler; stigmata brown; legs and tips of prolegs reddish. When the larva is full grown it eats its way nearly through the bark, leaving but a very thin layer unbroken; it then retires within its burrow, and having enclosed itself within a loose, silky cocoon, changes to a brown chrysalis. A short time before the moth escapes the chrysalis wriggles itself forward, and pushing itself against the thin papery-like layer of bark, ruptures it and the chrysalis protrudes as shown in the figure. Soon afterwards the imprisoned moth in its struggles ruptures the chrysalis and escapes.

This insect appears to be increasing in numbers every year, and is very destructive, especially to young maple trees. Many of our shade trees in London are much injured by it, and where very numerous it is liable to completely girdle the tree and kill it. It is also found throughout the Middle States. To prevent the moths from laying their eggs, the trunks of the trees should be painted about the 1st of June with a mixture of soft soap and lye about the thickness of paint, or with a mixture of lime and soap. When once the larvæ obtain an entrance it is very difficult to discover them, and they will then carry on their destructive work all through the summer.

THE RED-HUMPED APPLE TREE CATERPILLAR (*Notodonta concinna*).

This insect appears in the perfect or moth state (fig. 5) during the latter part of June. When its wings are expanded it measures from one inch to one inch and a quarter across. The fore wings are dark brown on the inner margin and grayish on the outer margin, with a dot near the middle, a spot near each angle and several longitudinal streaks along the hind margin dark brown. The hind wings of the male are brownish or dirty white, those of the female dusky brown; the body is light brown, the thorax of a darker shade.

The female deposits her eggs in a cluster on the under side of a leaf during the month of July, where they shortly hatch into tiny caterpillars, which at first consume only the

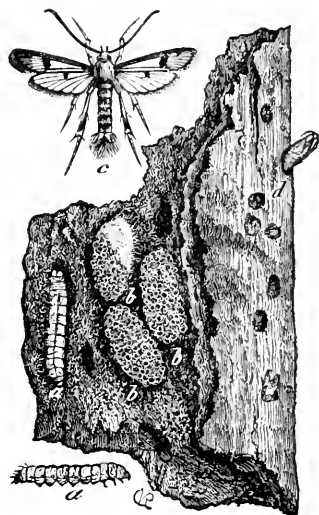


Fig. 4.



Fig. 5.

substance of the under side of the leaf, leaving the upper surface unbroken, but as they increase in size they devour the entire leaf. When not eating they lie closely together on the twigs, and sometimes entirely cover the branches they rest on; they attain their full growth during August or early in September. When mature the larva presents

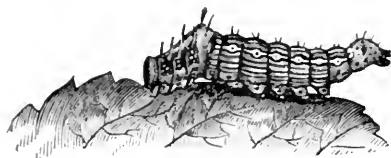


Fig. 6.

the appearance shown in fig. 6. The head is coral red, and there is a lump on the back on the fourth segment of the same color. The body is traced lengthwise by lines of black, yellow and white, and has two rows of black spines along the back, and other shorter ones upon the sides, from each of which there arises a fine hair. The hinder segments taper a little and are always elevated, as shown in the figure, when the insect is not crawling. It measures

when full grown about one and a quarter inches long.

They entirely consume the leaves of the branch on which they are placed, and when these furnish insufficient food to bring them to maturity, the adjoining branches are laid under tribute. When handled they discharge from their bodies a transparent fluid with a strong acid smell, which doubtless serves as a defence from their enemies, especially birds, since their habit of feeding openly in large flocks renders them particularly liable to attack from these active foes.



Fig. 7.

When full grown they all disappear about the same time, descending from the trees to the ground, where they conceal themselves under leaves upon or slightly under the earth. Here, after a long time, the larva changes to a brown chrysalis, fig. 7, and remains in this condition until late in June or early in July of the following season. They are very generally distributed, but seldom abundant, and while very partial to the leaves of the apple tree, feed also on those of the plum, pear, cherry, rose, and thorn.

As they feed in flocks during their entire existence, these larvæ can easily be gathered and destroyed, either by cutting off the limbs on which they are feeding and burning them, or by dislodging them by suddenly jarring the limbs, when the larvæ fall to the ground and may be trampled under foot.

THE EYED ELATER (*Alnus oculatus*).

This is the largest of our Elaters or "spring beetles," and is found with its larva in the decaying wood of old apple and other trees. The beetle, fig. 8, is about an inch and a half—sometimes more—in length, of a black colour, sprinkled with numerous whitish dots. On the thorax there are two large velvety black eye-like spots, from which has arisen the common name of the insect. The thorax is about one-third the length of the body, and is powdered with whitish; the wing cases are ridged with longitudinal lines, and the under side of the body and legs thickly powdered with white. It is found in the perfect state in June and July; is active in the daytime, flying about with a loud buzzing noise.

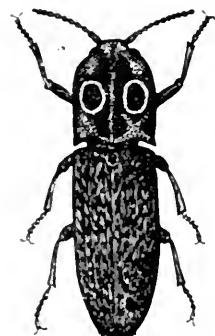


Fig. 8.

The mature larva, which attains its full growth early in April, is about two and a half inches long, nearly four-tenths of an inch across about the middle, tapering slightly towards each extremity. The head is broad, brownish, and rough above; the jaws very strong, curved and pointed; the terminal segment of the body blackish, roughened with small pointed tubercles, with a deep semicircular notch at the end, armed at the sides with small teeth, the two hindmost of which are long, forked, and curved upwards like hooks. Under this hinder segment is a large, fleshy foot, armed behind with little claws, and around the sides with short spines; it has six true legs, a pair under each of the first three segments. Early in spring the larva casts its skin and becomes a chrysalis, and in due time emerges a perfect beetle.

This beetle, when placed upon its back on a flat surface, has the power of springing

suddenly into the air, and, while moving, turning its body, thus recovering its natural position; this unusual movement, together with its curious, prominent eye-like spots, combine to make it a constant source of wonder and interest. Since it feeds only on decaying wood, it scarcely deserves to be classed with destructive insects.

THE STAG BEETLE (*Lucanus dama*).

This is another very common beetle, somewhat similar in its habits to the eyed Elater, but very different in appearance. It is a large and powerful insect belonging to the family called *Lamellicornes*, or leaf-horned beetles, from the leaf-like joints composing their antennæ. In the male, fig. 9, the upper jaws or mandibles are largely developed, curved like a sickle, and furnished internally beyond the middle with a small tooth; those of the female are much shorter and also toothed. The body measures from an inch to an inch and a quarter in length, exclusive of the jaws, and is of a dull mahogany-brown colour. The head of the male is broad and smooth; that of the female narrow and roughened with punctures. The insect appears during the months of July and August; is very vigorous on the wing, flying with a loud buzzing sound during the evening, when it frequently enters houses to the alarm of nervous occupants. It is perhaps scarcely necessary to remark that it is not in any way venomous, and it never attempts to bite without provocation.

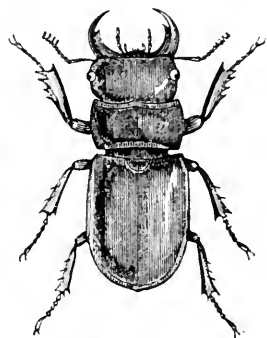


Fig. 9.

The female lays her eggs in the crevices of the bark of trees, especially near the roots. The larvæ live in decaying wood, and are found in the trunks and roots of various kinds of trees, particularly those of old apple trees; they are also found in old cherry trees, willows, and oaks. They are said to be six years in completing their growth, living all the time on the wood of the tree, reducing it to a coarse powder resembling sawdust. The mature larva is a large, thick, nearly cylindrical whitish worm, with a horny-looking head of a reddish-brown colour, dark mandibles, and reddish legs. The body is curved when at rest, the hinder segments being brought towards the head.

When the larva has attained full size it remains in its burrow and encloses itself in an oval cocoon formed of fragments of wood and bark, cemented together with a glue-like secretion, and within this enclosure it is transformed to a chrysalis of a yellowish-white colour. Through the partially transparent membrane the limbs of the future beetle are dimly seen, and in due time the beetle bursts its filmy enclosure and emerges to the light of day.

As this insect affects only old and decaying trees, it seldom does much harm. The use of alkaline washes, applied to the bark of the trees in July, would probably deter these beetles, in common with others, from depositing their eggs on the trees thus coated, and any mischief they might otherwise do be in this manner prevented.

SOME FUNGI-EATERS.

BY W. HAGUE HARRINGTON, OTTAWA, ONT.

It is related by a celebrated traveller and naturalist that, in the dreary islands of Terra del Fuego, the only vegetable food to be obtained by the wretched inhabitants, with the exception of a few berries, is a fungus which grows in great abundance on certain trees. This fungus appears on the bark in the shape of bright yellow, globular masses of the size of small apples, and at a certain stage of development is gathered and eaten uncooked. Other savage tribes inhabiting barren territories may be partially dependent on similar substitutes for the nutritious roots and succulent fruits used by more favourably located races; but civilized man, with his long list of food plants to choose from, considers fungi more as luxuries than as essential articles of diet.

The common field Mushroom (*Agaricus campestris*), found wild throughout the greater part of the world, ranks high as a table delicacy, and is largely cultivated in some countries. Several other species of fungi are also used in considerable quantities; for instance, the famous Truffle, which grows several inches below the surface of the ground, and requires to be hunted with the aid of dogs trained to scent them out. Many others, likewise very wholesome and palatable, are, however, seldom used because of their resemblance to poisonous varieties.

We find man not alone in his liking for fungi and his use of them as food. Domestic cattle and many wild animals also relish them and devour species shunned by man. The insect world produces a great variety of species subsisting either in the larval or perfect state, or in both, upon fungus. Often when a fine, fresh-looking, pink-gilled, snowy-clad Mushroom is plucked, the picker finds, much to his disappointment and disgust, that his savoury morsel is already "food for worms." A number of small grubs are feasting within the stalk, and in a few hours the cherished Mushroom becomes a black decaying mass, filled with little maggots.

A great variety of fungi are similarly attacked and made the banqueting chambers of numerous foes. The tender, short-lived species, such as Mushrooms and Toadstools, decay and perish quickly; but the harder kinds, growing upon old and dead or fallen trees, harbour their tenants much longer, and preserve their shape and outward comeliness even after they have been eaten and withered away inwardly.

The object of this brief paper is to call the attention of any who have recently commenced collecting to the fact that fungi are so much frequented by insects, and that many species can be obtained from them with but little trouble. I will therefore briefly mention a few of the numerous *Coleoptera* which I have taken on or in fungus, not because they are rare beetles, but rather because they may be easily obtained and are well known.

Megalodone heros is the finest beetle which I have found feeding upon fungus. It belongs to the *Erotylidae*, a family known by the large antennal club, formed by an enlargement and flattening of the three last joints. This family is said to be largely developed in tropical America, where its members are mostly leaf-eating beetles, differing in this respect from northern species, which live upon fungi. One day last summer (9th June) I met with a number of large chocolate-coloured fungi growing upon the roots and bark of the stumps of some large hemlocks recently felled. Hiding in crevices of the bark, or in the damp chips and leaves from amidst which the fungi on the roots were springing, I discovered numerous specimens of this handsome beetle and collected about thirty, which had been recently feeding upon the fungus, as evidenced by the holes gnawed therein.

The beetles varied much in size, being from four to seven-eighths of an inch long. They are of an elongated oval shape, three times as long as broad. The head, bearing the distinguishing knob-tipped antennae, is inserted to the eyes in the almost square thorax. The beetle is broadest across the base of the elytra, which taper gradually and are rounded off at the tip. Each elytron is marked by two orange patches; the one at the base is somewhat in the form of a Maltese cross with the lower arm broken off, but varies in different specimens; the other is an irregular band about one-third the distance from the tip. With the exceptions the beetle is of a jet black, highly polished, and is a handsome insect. About six weeks later I visited the same locality in the expectation of obtaining some more of these fine beetles, but could find none. In some fresh fungi of the same kind I found numbers of large stout grubs, from one-half to over three-quarters of an inch long, with a broad black band across the top of each segment. They were probably the larvae of this beetle, but as I did not succeed in rearing any of those I took, and could not visit the place again, they may have been those of some fungi-eating *Tenebrio*, to some larvae of which family they had much resemblance.

From the same fungi from which I had previously taken the above-mentioned beetles, and which were now hard and dry, I obtained nearly forty specimens of *Bolitotherus cornutus*, the majority female. This beetle belongs (with the two species next to be described) to the *Tenebrionidae*, the members of which family live chiefly in or about dead stumps and logs, hiding in crevices or under bark, fungus, and moss. It is a dark-

brown or dull black beetle, thickly covered with tubercles, so that it looks like a bit of rotten bark or dry earth, and easily escapes detection when it drops to the ground with its legs tightly folded. The male has two horn-like projections upon the thorax and also two minute ones on the front of his head. Those on the thorax are more than an eighth of an inch long, flattened inwardly at the end, and fringed with a light pubescence. The beetles are found abundantly during the summer and autumn, feeding upon the large woody fungi which spring from stumps and decaying trees. While the beetles are found imbedded in holes gnawed in the surface, the larvæ in different stages will be obtained by breaking apart the fungus, in which they burrow out cells until the whole mass is full of holes and tunnels filled with excrement. The grubs are long and cylindrical, attaining when full grown a length of three-quarters of an inch, and have two spines on the last segment, as have the larvæ of many species of this family.

Diaperis hydri is a small stout beetle, a quarter of an inch long, common in fungus growing upon old and decaying beech trees (such as are infested by *Dicercia livaricata* and *Tremex columba*). It is very smooth and glossy, and is jet black with the exception of the elytra. These are light brown, and are marked by two small black dots just behind the thorax and by two larger ones midway between these and the tip. They are also ornamented by lines of minute punctures, hardly visible to the naked eye, and not interrupting the glistening appearance of the beetle.

Hoplocephala bicornis is a little dark greenish beetle, found in great numbers in the dry leathery fungus which grows, like overlapping scales, on hardwood stumps. Although this beetle is less than one-fifth of an inch long, the male may be easily distinguished by the two little spines or horns which he bears on his head, and from which the species derives its name. They soon reduce the dry fungus to a white powdery state.

Mycetophagus punctatus is abundant in the fresh, soft, white fungi which grow from the bark of various trees, not in compact masses, but laminated or gilled beneath like Toadstools. On giving the tree a smart tap, the beetles will shower down from between the gills upon a beating net held below. They are nearly one-fourth of an inch long, and are black, except the yellowish elytra, which are marked by a black spot surrounding the scutellum, a black band across near the tip, and two black spots midway between this band and the thorax. Associated with them are generally found numbers of a smaller but very similarly coloured species, *M. flexuosus*.

Similar fungi will sometimes be found to contain a great many very slender little white grubs, with a black head no larger than a pin-hole. I have seen them twisted together in such lumps that the black heads seemed like some tiny creatures creeping about over the wriggling mass, in which the respective bodies were lost. These are the larvæ of *Triplax thoracica*, a reddish beetle, one-fifth of an inch long, with blue-black elytra, belonging, like the first beetle described, to the *Erotylide*.

Penthe obliquata is a very active beetle, which scampers hastily away when disturbed at its fungus feast or in its hiding-place under bark, and thus frequently eludes its discoverer. It is of a deep dull black, only relieved by the reddish-yellow scutellum and a yellow apical joint to the antennæ. The elytra are very dense and irregularly punctured. This fine beetle is half an inch long and almost oval in shape. A rarer and slightly larger, but not so handsome insect, is *P. pimelia*, which have found under the bark of old trees. It is of a dull brownish-black, and has the elytra more evenly and less densely punctured. As it lacks the yellow scutellum, it is easily distinguished from the preceding species.

Many *Staphylinide* are found in the stalks of Toadstool and in other fungi, while those of many other families resort to these productions either for an occasional meal or for a life-long diet. Such are *Cratoparis lunatus* among the weevils, and *Onthophagus hecate* of the Scarabeans. To even enumerate these would require much space, but I think I have already written enough to show that the your collector will find it profitable to search the different fungi for specimens, especially early and late in the year, when other feeding grounds are unproductive. I might add that many insects in turn fall victims to fungi. The house-fly is a familiar instance of this, and every fall we see great numbers of them stick to our walls and windows, their bodies distended by the fungus, which also spreads some distance around them.

FIELD NOTES—1881.

The earth, covered by its first mantle of snow, reminds one that the collecting season is virtually ended, and the lengthening evenings allure one to the study fireside to go carefully over note-books and collections and to read the recorded labours of fellow-Entomologists.

A few memoranda from my own note-book may perhaps not be barren of interest to some of the less experienced readers of the *Entomologist*. I find that almost the first insect of spring was the Mud-wasp (*Polestes annulatus*), which appeared with a few flies and spiders about the 15th of March. This wasp is very abundant here, and from the pulverized macadam of the streets thousands of its mud cells are constructed every summer under the window-sills and numerous cornices of the Parliament Buildings, about which the wasps linger until the end of October. Toward the end of March a few bees and a number of small beetles, as *Amara interstitialis*, appeared. *Pieris rapæ*, the cabbage butterfly, was observed on April 1st, but from this date to the 8th of the month a severe cold spell (thermometer touching zero) reduced insect appearances to the minimum again. At its conclusion they emerged in still greater variety and number; *Vanessa antiopa* flitted about in sunny glades of the wood; *Cicindela pupurea* enlivened the fields, and its relatives, *C. vulgaris* and *C. sex-guttata*, the roads. Mosquitoes came in full force a fortnight later, and on the 24th I obtained a number of *Buprestidæ* upon young pines, viz., 1 ♂ and 2 ♀ *C. virginensis*, and 14 ♂ and 13 ♀ *C. liberta*. I was somewhat surprised to find them so early in the year, yet could have taken many more. They were generally paired, in several instances copulating. Great numbers of Saw-flies were also upon the pines. A few days later I captured specimens of *A. striata*, and by the beginning of May all orders of insects were well represented. On the 6th *Serica sericea* was abundant on the foliage of wild gooseberry bushes. *Chrysomela elegans* was also unusually numerous, but I could not find upon what it fed. *Platycerus quercus* was found eating the buds of maples and other trees. The buds were often completely eaten out, and the beetles hidden from view therein. In some buds a male and female were found copulating. This beetle was new to my collection, but I found them frequently again during the summer when using a beating net. During May the curious larvæ of certain *Lampyridæ* were often seen in damp woods, crawling on the trunks of trees, such as cedar, or affixed by the tail to the bark, undergoing their metamorphoses in a similar manner to the larvæ of the *Coccinellidæ*. Some reared at home emerged as *Photinus angulatus*. The larvæ, and to a less degree, the pupæ, emitted a strong greenish glow from two of the posterior segments; the imago being, of course, one of our common "fire-flies." Some of the larvæ were thickly covered beneath with small ticks, of a bright vermilion colour, which had their pointed heads plunged between the armoured segments of the larvæ. They were not easily dislodged, but walked rapidly when free. By these little parasites the larvæ were so weakened as to perish before completing their transformations. The warm weather of mid-May brought forth increased hosts of insects, and the sultry air, especially in the neighbourhood of lumber yards, swarmed with *Scolytidæ*, etc. Toward the end of the month I took a trip, with three friends, to the Wakefield Cave, about twenty miles north of the city, and in my spare moments collected a number of insects in that vicinity. *Cicindelidæ* especially abounded on the sandy hill-side roads, and I captured three species which are rare, or not found about here, viz., *C. 12-guttata*, *C. longalabris*, and *C. limbalis*. On my way back I took a specimen of *C. sex-guttata* having only two spots (the anterior one on each elytron). Although called Six-spotted Tiger Beetles, very many have eight spots, and specimens with ten spots are frequently taken. In a beech grove at Chelsea, *Ithycerus curculionides* was very abundant; several could be seen on nearly every tree; many pairs were copulating. Where do the larvæ live? On the 31st of May several specimens of *C. Harrisii* were taken on pine saplings, and *H. Pales* and its long-snouted relatives were in full force. On June 4th, *Saperda vestita*, *Oberca amabilis*, *B. nasicus*, *C. nenuphar*, *A. quadrigibbus*, and many other weevils, elaters, etc., were noted. At an excursion of the Ottawa Field Naturalists' Club to Montebello (45 miles down the river), on 26th June, I captured 129 species of *Coleoptera*,

a considerable percentage of which were new to me. *Carabidae* were particularly abundant under drift-wood and dead leaves on the damp, shady shore, and 35 species were taken. *Chrysomelidae*, *Elateridae*, and *Curculionidae* were next in number with 15, 13, and 13 species respectively. After midsummer my opportunities for collecting were few, and my notes correspondingly scanty. I will merely mention the capture at Aylmer and Hull, on Oct. 2nd, of *Aletia argillacea argentata*, the cotton moth; both specimens were in perfect order, not in the least rubbed or worn. In October, 1880, I took several specimens about the city, also apparently recently emerged.

CARBOLIC ACID AS A PREVENTIVE OF INSECT RAVAGES.

(Read before the Sub-Section of Entomology of the A. A. A. S.)

By A. J. COOK, LANSING, MICH.

One year ago I gave at the Boston meeting of the Association for the Advancement of Science the results of some experiments in the use of London purple to destroy the codling moth larva, and bisulphide of carbon in fighting the cabbage maggot and squash borer. These experiments have been repeated the present season, and with results no less favourable than those reported one year ago. I think it is an established fact that the methods recommended are valuable. They not only seem reliable, but they promise to be the cheapest and most desirable modes that can be made practicable on all occasions.

As stated last year, the bisulphide of carbon will also destroy the radish maggot (*Anthomyia raphani*), but owing to the great number of plants to be treated, the amount of the liquid necessary to do thorough work is large, and so the expense is perhaps too great to warrant its use in case of this insect. The present season I tried to see if we might not make the application in a few places about the bed, at some distance apart, and still effect our purpose to destroy the maggots. The result does not recommend this liquid for the destruction of the radish *Anthomyia* with the same emphasis that we may safely give in advising its use for the cabbage *Anthomyia* and the squash *Egeria*. This fact led me to cast about for some more desirable agent to be used against the radish fly, and it occurred to me that carbolic acid, which is not only very repellant to insects, but also quite as remarkable in retaining its obnoxious odour for a long time, might be made most serviceable in this warfare.

I prepared some of this material as follows: To two quarts of soft soap I added two gallons of water. This was then heated to a boiling temperature, when one pint of carbolic acid (in a crude state) was added. This mixture is then set away in a barrel or other vessel, and is ready for use as occasion may require. I mixed one part of this liquid to fifty parts of water, to be used on the radish plants. It was used by three parties in three places. Mr. Lee used it in the College garden, a student—Mr. E. Hale—used it on a bed specially prepared, and I used it in my own garden. Mr. Lee sprinkled it on the plants, and poured it into a trench made close beside the row of plants. Mr. Hale and myself sprinkled it directly on the plants. Messrs. Lee and Hale made but one application, and found that it kept the insects at bay for about two weeks. Even this proved of no little service. I made the application once every week, and the radishes were almost entirely free from the maggots. My bed was seventy or eighty rods from the other beds. But I caught the flies about my garden, and plants near by, not treated, were badly injured by the maggots. Two cautions should be urged: first, sprinkle the plants as soon as they are up, and thereafter every week or ten days; secondly, the mixture, if sprinkled directly upon the plants, must not be so concentrated as to injure the plants. My experiments this season make me feel certain that this will prove a valuable remedy, and if cheaper, it may even replace the explosive bisulphide of carbon in fighting the cabbage maggot and the squash *Egeria*.

About my house at the Michigan Agricultural College I have planted a little apple orchard of eight trees. The trunks and larger branches of these trees have been thoroughly washed twice each spring, the last week of May and the last week of June, with soft soap. A neighbour but a stone's throw distant set out some fine primates about the same time that I set out my trees. He does not believe in the use of soft soap, practically at least, and his trees are sorely disfigured and greatly injured by the *Saperda candida* and the *S. cretata*, while my trees are smooth and admired by all. I have some pear trees in the same orchard which were not treated with the soap, one of which has been much injured by the borers.

This year I used the undiluted carbolic mixture instead of the soft soap. I fully believe this to be an improvement on the soap alone, as in some cases, if but one or even two applications of the soap are made, the effect is not so long continued as to entirely prevent the borers from egg laying. The carbolic acid will tend to extend the period, so that I believe two applications will in every case repel the beetles.

ENTOMOLOGICAL PAPERS.

BY JAMES T. BELL, BELLEVILLE, ONTARIO.

ARBOREAL AUSCULTATION.

Some time ago, while visiting the Dean and Williams Gold Mine, in the township of Marmora, I was interested in observing the proceedings of some woodpeckers which resorted to some half-dead pine trees in front of my room window. I remarked that after alighting they would run upwards in a zigzag way, stopping occasionally, and applying the side of their heads to the tree, evidently listening for the noise made by a grub while gnawing the wood. Suddenly a bird would begin to dip into the bark, the rapid strokes of its powerful bill making the chips fly faster than a lumberman's axe. On one occasion, by the aid of an opera-glass, I saw one fellow transfer something large and white from the cavity he had excavated to the interior of his craw, but the quickness of the action prevented me from ascertaining precisely what it was.

Thinking of this, it has occurred to me that the presence of a "borer" in a fruit or other tree might be ascertained in the same manner by the use of a tube of wood or tin-plate formed like a stethoscope or ear-trumpet; by applying the wide end to the tree and the small end to the ear, the exact locality of the grub could be determined, when the application of a stout bradawl or small gimlet would put an end at once to his life and his depredations without material injury to the tree.

HOW WE CAPTURED A HORNET'S NEST.

One fine day last October, while enjoying a ramble in the woods near Belleville, with two of my sons, one of them took hold of a knot which projected from a small half-decayed log, intending to turn it over to search for beetles beneath it. The piece, however, came away in his hand and disclosed the entrance of a nest of black hornets. Of course we retreated "at the double" before the disturbed insects recovered from their first surprise, leaving them to settle down at their leisure. A few days after, taking advantage of a cool morning, I sent my two boys to the wood with a small bottle of chloroform and a hard rubber syringe. According to directions, they injected about a drachm of the liquid into the hole, and threw a handkerchief over the entrance. In about five minutes they opened up the nest, when they found the inmates in a perfect state of slumber, and transferred them without trouble to their cyanide bottles. In about an hour they returned, bringing me forty-eight specimens of the insect.

COLLECTION NOTES FOR 1880.

The early months of 1880 were especially favourable to the acquisition of the hibernating Coleoptera, and those which have their permanent habitat among the moss of our woods and swamps. The early disappearance of the snow laid bare their hiding places,

while the frosts which succeeded formed an ice-bridge which gave access to their places of refuge, which in ordinary seasons remain covered with snow till the general break-up of the winter, when they are rendered inaccessible by being surrounded or covered with water. Mr. J. D. Evans and myself, who are the sole representatives of the Entomological Society in this district, took advantage of these favourable circumstances and commenced a vigorous course of moss-hunting, lasting from March 1st to May 24th. During this period we collected upwards of 1,000 specimens of over 100 species, of which the following are not included in the Society's published lists. The numbers are those of Crotch's Check List, and the determinations, with few exceptions, were made by Mr. H. Ulke, of Washington, and Mr. E. P. Austin, of Boston :—

- 7496 *Anchus pusillus*.
- Hydrochus* (nova species, Ulke.)
- 1579 *Trichopteryx Haldemanni*.
- “ 2 sp. (nova species, Ulke.)
- 2102a *Pselaphus longiclavus*.
- 2110 *Bryaxis conjuncta*.
- 2120a *B. propinqua*.
- 2134 *Decarthron formiceti*.
- 2139 *Arthmius globicollis*.
- 2295 *Seydmanus bicolor*.
- “ 2 species not determined.
- 2366 *Latridius deletus*.
- 2572 *Atomaria ochracea*.
- 5670 *Xanthonia Stevensii*.
- 5771 *Plagiodera cochleariæ*.
- 6294 *Paratenetus gibbipennis*.
- 9027 *Tanysphyrus lemnae*.
- 9293 *Ceutorrhyncus semirufus*.
- 1818 *Philonthus palliatus*.
- 7749 *Stiliclus biarmatus*.

All the above were taken from moss, and in addition the following, which are already registered as Canadian : 2095, 2100, 2102, 2103, 2113, 2124, 2130, 2149, 2150, 2164, 2283, 2285, and about 70 species of *Carabidæ*, *Staphylinidæ*, *Chrysomelidæ*, *Curculionidæ*, etc.

3932 *Alaus gorgops* ; from a stump in Bleecker's Woods.

On June 7th we experienced a heavy gale from the S.W., and on the 12th one of my daughters, who was visiting at West Lake, Prince Edward County, went with a picnic party to the Sand Banks, on the shore of Lake Ontario. There she found the beach strewn with *Calosomas* and other *Coleoptera*. On her return she brought me 16 *C. scrutator*, 13 *C. Wilcoxi*, 1 *C. frigidum*, and many other beetles. On July 1st, Mr. W. R. Smith being at Brighton, found on the beach at Presq' Isle a similar display of *Calosomas*, and brought me 14 *C. scrutator*, 24 *C. Wilcoxi*, and 3 *C. frigidum* ; unfortunately most of them were spoiled from exposure.

On June 1 I had brought to me a rather fine specimen of *Eacles imperialis* and a good male of *Xyloryctes satyrus*, both taken within half a mile from the city limits.

With these exceptions, the season of 1880 has proved the least favourable to the Entomological collector, in this quarter at least, of any I have experienced in my 21 years' residence in Canada. Very few *Lepidoptera* were seen, either on the wing or at sugar; beating the bushes was singularly unproductive, and I have more than once picked stumps and turned over stones for a full hour without getting 20 specimens of all sorts.

NOTES ON A PARASITE—ON THE PAINTED LADY BUTTERFLY
(*Pyrameis Cardui*).

BY CAROLINE E. HEUSTIS, CARLETON, ST. JOHN, N.B.

I send you a few specimens of an insect which I have found parasitic on the larvæ of *P. cardui*. For several successive summers I have reared a number of these caterpillars, with which our thistles in most seasons abound. I observed variations in size and colour of the larvæ found feeding on the same plant, which led me to suppose that they might not belong to the same species. I have always observed that a large proportion were almost black, and much smaller than those from which I have obtained good specimens of *cardui*, but until the last summer my efforts to raise these were not attended with success, all the small black larvæ dying before they had attained their full growth, although they fed well for a time.

Last season I collected from a group of thistles of the same species fifteen caterpillars, and put them in breeding boxes. They all ate voraciously, and one after another went into chrysalis, except two, which died on the bottom of the box, after having made several ineffectual efforts to suspend. Those which died were black. I carefully marked those which I suppose other than *cardui* as they suspended, and watched for the advent of the butterflies. I observed that the chrysalids of the black specimens were bright golden, and smaller than those of the bright and healthy-looking larvæ. The chrysalids of the latter were grey, ornamented with white stripes along the sides. (This insect has been kindly determined by E. T. Cresson, of Philadelphia, as *Ichneumon rufiventris*).

ENTOMOLOGICAL NOTES.

BY J. ALSTON MOFFAT, HAMILTON, ONT.

Calosoma Scrutator.—In connection with Mr. Fletcher's interesting article on "*Calosoma Scrutator*, the Beautiful-bodied Searcher," in our last Annual Report, I desire to relate my experience with this insect during the summer of 1881. On 11th June I left Hamilton for Long Point. I had half a day to spend at Port Dover before the boat left. About noon a strong breeze sprung up from the S.W., which drove the waves up the shore. I took a stroll along the beach, and had not gone far when I saw a greenback just landed, making rapid strides with his long legs away from the water, and I seized my first living *scrutator*. I took several of them that afternoon alive, some of them simply that and nothing more. At Long Point the evidence of what had been was unmistakable; the water lines of various storms of different forces were marked with bands of green wing-covers. I was too late for the harvest, very few coming ashore while I was there. When sugaring for moths we took from 2 to 5 every night, and one night 16. A large gauze-winged fly was attracted in great numbers to the sugar, and the *scrutator* was attracted by them, for in almost every instance we took them with one of these in their jaws. When seized they would drench the fingers with an acrid fluid of the most offensive odour; it was very volatile, drying rapidly with a sensation like alcohol. In one instance I took one from under a board on the beach, and in blowing off the sand that adhered to it some of the fluid struck my lip; it burned for an instant sharply. The odour from them leaves in a very short time. Does it not seem strange they should remain so scarce in the country when they are landed in such numbers on our shores alive? A friend, Mr. A. H. Kilman, of Ridgeway, writes me that they came ashore this spring after a south-west storm in hundreds, dead and alive. And we may suppose it to be about the same along the whole north shore of Lake Erie, and yet I know of but three taken in the neighbourhood of Hamilton in 20 years.

Saperda Fagi.—On the 11th of June I took a pair of *Saperda Fagi* upon thorn, a rather rare insect with Canadian collectors hitherto, I believe. Ten years ago or more I captured one, and had not met with it since, but this year amidst a general scarcity it seemed to be quite abundant here, the different collectors finding it well represented in

every direction around the city. One day, coming on a favourable locality, I took 19; returning to the same place the following afternoon, I got 30, and had to leave before 4 o'clock on account of rain—going back a few days later and securing 34. I found old bushes in an exposed situation the most productive.

Papilio Cresphontes.—On the 6th Oct., 1880, I took six *cresphontes* larvæ feeding on prickly ash. Some of them fed for several days afterwards, and in due time they all transformed to chrysalids. Now they have all emerged as butterflies; the first appeared on the 22nd of March, the last on the 17th of April, 1881. They measure from $3\frac{3}{4}$ to $4\frac{1}{2}$ inches in expanse of wing, perfect in form and rich in colouring.

Heliothis Armigera Hub.—It seems rather strange that this, so common an insect in many parts, should have been but noticed here for the first time this season. Widespread in the range of its habitat, having been taken in England, Australia, and Japan, it is also pretty general in its feeding, accommodating itself readily to the conditions of the locality. The caterpillar known by the name of the boll-worm in the Southern States, from the vast amount of injury done by it in eating into the cotton-boll, is known in the Western States as the corn-worm, but has been found also in other countries to be very destructive in the field to green peas and pumpkins, and in the garden to tomatoes and the gladiolus. If it should become permanent amongst us and abundant, it will be no small addition to the band of enemies which our cultivators of the soil have already to contend with. The late B. D. Walsh, M.A., the much-lamented State Entomologist of Illinois, writing of it in 1869, says, "It attacks corn in the ear, at first feeding on the silk, but afterwards devouring the kernels at the terminal end, being securely sheltered the while within the husks. We have seen whole fields of corn nearly ruined in this way in the State of Kentucky, but nowhere have we known it to be so very destructive as in Southern Illinois." Again he says, "In 1860, the year of the great drought in Kansas, the corn crop in that State was almost entirely ruined by the corn-worm. According to the *Prairie Farmer* of Jan. 31st, 1861, one county there, which raised 436,000 bushels of corn in 1859, only produced 5,000 bushels of poor wormy stuff in 1860; and this, we are told, was a fair sample of most of the counties of Kansas." In these extracts we have evidence of its powers of devastation when abundant. In these States it is double-brooded; whether it is so here or not does not yet appear certain, but that it is double-brooded in New Jersey has been most conclusively proven by the careful investigations of Mrs. Mary Treat, of Vineland, N. J. It was quite plenty here in the early part of September, feeding in the daytime on the flowers of the golden-rod and in the gardens. Several of the *Agrotis* family were flying at the same time, which are known to be but single-brooded. The probabilities are that it may be the same here also. A night-flyer properly, or in the dusk of the evening, it seemed to have been tempted from its hiding-place by that peculiar dull, smoky weather we had so much of during the first three weeks of September, when even the Sphingidæ forgot their usual caution and came forth boldly to feed at mid-day, having taken a tomato-sphinx (*M. Quinquemaculata*) at 2 o'clock in the afternoon of the 14th, feeding on petunias, whilst the white-lined sphinx (*Deilephila lineata*), which, by the way, was most unusually abundant, could be seen by the half-dozen among the flowers at any time of the day. The *Heliothis* moth is a pale clay yellow on the front wings, but quite variable in depth of shading, with olivaceous markings and a conspicuous dark spot near the middle. The hind wings are paler, with a dark brownish band on the outer margin. Being about $1\frac{3}{4}$ inches in expanse of wing, it was quite a conspicuous object while feeding, more especially as it seldom rested, but kept its wings amoving the while. The caterpillar is said to vary in colour from a pale green to a dark brown, but the ornamentation is constant, which is longitudinal light and dark lines, and black spots from which rise a few soft hairs.

FOOD HABITS OF THE LONGICORNS.

BY F. B. CAULFIELD, MONTREAL, P.Q.

In June, 1873, while collecting in a small swamp on Montreal Mountain, I caught a specimen of *Pogonocherus mixtus* (Hald.) on my coat-sleeve, and as the insect was new to

me I commenced a search for others. Upon examining a dead branch of a small willow growing close by, I found that it had been extensively bored by some small insect. The part attacked was about three feet from the trunk, and at this place the branch, for about twelve inches, was full of holes from which the insects had escaped. Not finding them, I searched further along the branch, and near its extremity, where it was reduced to the thickness of a twig, I found a number of the above-named species. They were lying on the branch with their bodies pressed closely against it, and in this position could with difficulty be distinguished from the withered buds. I observed several pairs in coitu, but none of the females were ovipositing. They appeared to be very sluggish, lying almost motionless, although the sun was shining brightly at the time. Having bottled all that were to be seen, I cut off the branch where it had been perforated, and found a number of the beetles in it, but neither larva nor pupa.

Gaurotes cyanipennis (Say).—I find this insect in spring on thorn blossoms, and later in the season pairing and ovipositing on butternut.

CUPES CAPITATA.

By E. BAYNES-REED, LONDON, ONT.

For some years past I have been, during the month of July, in the habit of collecting specimens of this pretty little beetle on the fence of a churchyard adjoining my residence. This year they were exceedingly numerous, and I captured in four days over 80, of which some 50 were females. It is curious to note that I have invariably found that certain pickets of the fence were selected by the beetles, and that out of a long distance of fencing round the sides of the church, these few pickets on one side would be the only place to find the beetle. I can give no reason for such selection—the trees and food plants round the fence are similar; they congregate for breeding purposes and then suddenly disappear, and can only be rarely found afterwards.

NOTES ON LYTTA (BLISTER BEETLES).

By PROF. E. W. CLAYPOLE, YELLOW SPRINGS, OHIO.

During the present summer three species of *Lytta* have been very abundant and destructive here. The Striped Blister-beetle (*Lytta vittata*) in the early part of the season, about the end of June, began to do mischief to the potato plants, especially where they were weedy. Later on, about the middle of July, this species was joined by the White-edged Blister-beetle (*L. marginata*), and both together fell upon the later kinds of potato (in my garden the Buckeye). Now (August) the Black Blister-beetle (*L. atrata*) may be seen in company with the former two where a few belated plants afford them any green fodder. The last mentioned of the three, however, did not arrive in time to do any serious harm to the potato, but turned its attention to a large bed of sunflower belonging to my children, and are preying upon their yellow petals greedily. From twelve to twenty may be often seen upon a single plant.

All these three species "play possum" when frightened, but not all in the same way. The black one drops from the plant as does the Colorado Beetle (*D. 10-lineata*), but does not fold in its legs and antennae and roll about. It lies just where it falls for some seconds, with limbs in the position in which they were when it dropped. The white-edged and striped species fall as if struck dead, but always alight on their feet or gain them immediately, and stand looking warily about them. If no danger seems near, or if an attack is made upon them, they run, and having the longest legs of the group, they run fast and are difficult to catch. But their bodies being soft they are easily crushed. Their

juices, as their name implies, are exceedingly blistering, and soon raise a water blister on the skin if applied to it. Hence they are often used locally as a substitute for the Spanish Fly.

The presence and voracity of these Blister-beetles make it very difficult to keep a bed of potatoes clean by hand-picking of any kind, but of course Paris Green or London Purple is as destructive to them as to the Colorado Beetle, and forms the best remedy. They are so wary that it is almost enough to clear the plants if one walks between the rows so that one's shadow falls on them. They may be seen dropping to the ground in a shower.

Though these three species are so abundant here, I have not seen a specimen of the fourth member of the group, the Ash-grey Blister-beetle (*L. cinerea*), this summer, and a row of English Broad Windsor Beans which I planted as an experiment were quite untouched by them. The late Mr. Walsh says he never could grow these beans at Rock Island, Ill., because of the swarms of Ash-grey Blister-beetles which ate them up. My broad beans were, however, badly injured by numbers of a small black hopping beetle, the name of which I do not know, but which treated their leaves exactly as the Turnip Flea Beetle treats the seed leaves of the young turnips. It was, however, much larger.

Not to paint the Black Blister-beetle any blacker than is just right, I must add that I not long ago found a swarm of them devouring the flowers of the great rag-weed (*Ambrosia trifida*). One of them, which I watched for some time, cleaned the whole of the flowers from one of the involucre of the raceme in a few seconds.

THE COLORADO BEETLE.

The following extract from an English newspaper, the *Bristol Mercury*, will show how carefully the Colorado Beetle is looked after in England, and how great a risk he runs if he sets foot within the United Kingdom. He is far more sternly outlawed than was Robin Hood or Smith O'Brien, and if only a suspicion of his presence is felt, all, from the Privy Council downwards, are up in arms to crush him with all the terrors of the law. Let us hope they will succeed in making the country too hot for even the ten-lined Spearman:—

“Mr. Borlase put a question as to the discovery of a Colorado Beetle in South Devon.

“Mr. Mundella answered, saying the Colorado Beetle was in his department. (A laugh.) He then gave the facts of the discovery of a live Colorado Beetle in the possession of a man at Yealington, who refused to give it up. Upon instructions from the department he was prosecuted under the Destructive Insects Act of 1877, and fined the mitigated penalty of £5, he pleading ignorance of the law and agreeing to the destruction of the beetle.”

ENTOMOLOGICAL NOTES FOR THE SUMMER OF 1881.

I came only last year to the premises where I am now residing, and though I had a small crop of cherries, they were so badly infested with the weevil (*Canotrachelus nemophar*) that only a few quarts could be found free from the grub and fit for canning. This year a fair crop was promised; the spring was late and the danger of the frost little. I proposed, therefore, to make war upon the enemy, and as soon as the blossom was over prepared a large sheet of cheese-cloth, and for about three weeks jarred the trees before breakfast almost every morning. As the result, I have now nearly 2,000 weevils peacefully reposing in a bottle, after a composing draught of benzine. Only about 10 per cent. of my cherries this year were unfit for use. I carried the war into the orchard, and, simply by way of experiment, jarred some of the early apple trees and captured a great many of my enemies. I am more than repaid for my labours both on the cherry and apple trees, by the quality of the apples. When last year, with a larger crop, I only obtained knotty, gnarly fruit, I have this year round, smooth, well-shaped apples. I have never heard that anything has been done, at least in this neighbourhood, to trap the weevils on the apple trees. Those who live in the North have no idea of the mischief wrought here by the weevil in the orchards.

A word for the mole. In digging potatoes this year, I observed the runs of a mole in all directions through the ground. It was a piece of old sod, and very much infested with white worms, the larvæ of the Cockchafer (*Lachnosterna fusca*). Many of the potatoes had been partly eaten by these worms, but I observed that wherever a mole-run traversed a hill of potatoes no white worm could be found, even though the half-eaten potatoes were proof of his former presence. The inference is fair that the mole had found him first and eaten him, and very likely the mole's object in so thickly tunnelling this piece of ground was to find these grubs.

Now, it would be very easy to trump up a charge against the mole on the evidence of these facts. There was the "run" which nothing but a mole could make, and there were the gnawed potatoes; put the two together and kill the mole. Many a man has been punished on less conclusive circumstantial evidence. But it is perfectly easy to distinguish the work of a mole from that of a white worm, if one will only take the pains. I have many times found the latter coiled up in the potato he was eating, but I have never seen the mark of teeth such as the mole possesses on a potato. Nor do I believe the mole ever meddles with potatoes or corn.

Abundance of Certain Insects.—The Southern Cabbage Butterfly (*P. protodice*) is exceedingly abundant here this summer. I have been able to count scores on the wing at one time.

The Potato Worm, or larva of *S. 5-maculata*, is troublesome on the late potatoes this month (September), and soon strips a plant of its leaves. However, he is easily dealt with, as he is at once betrayed by the casting on the ground, and a little "poison dust," such as I use for the beetle, soon makes an end of him. I have tried "Buhach" on this insect, but find the former much easier of application and more effective. The latter diluted with ten parts of flour had little effect on the worms, but when used neat it stopped their feeding and killed two of them in a couple of days. But there is the trouble of looking up the creature (green on a green ground) in order to put the powder "where it will do the most good," whereas one need only shake the powder-tin over the plant and pass on, leaving the worm to poison itself.

The same is true of the Cabbage Butterfly (*P. rapæ*) in the early stages of growth of the cabbage. I have used Buhach, and a friend of mine is now using it on a plot of 3,000 heads of cabbage, but the time spent in finding the green worm on the green leaf is a serious drawback, and while the plant is very young I prefer using the "poison dust." I can sprinkle a whole bed while I am finding the worm on a dozen cabbage-heads in order "to put salt on his tail." The "poison dust" to which I refer is made by mixing one part of London Purple and sixty parts of ashes, and passing the mixture several times through a fine sieve. I may add, that I find this a very efficient remedy for the turnip fly.

BOOK NOTICES.

THE CANADIAN SPORTSMAN AND NATURALIST, Vol. I., Nos. 1 to 8.

This is a monthly journal published in Montreal, and edited by William Couper, a well-known naturalist and sportsman. Each number contains eight pages of matter arranged in double columns, printed in first-class style and on good paper. The articles are short and interesting, treating mainly of matters pertaining to hunting and fishing, with brief descriptions of Canadian wild animals, birds, etc.

The editor's extensive experience and travels in the Lower St. Lawrence is manifest in his articles on the rivers of that district and their products. Entomology also comes in for a share of attention. The fifth number contains a valuable contribution from Dr. J. H. Garnier, of Lucknow, Ont., on the Reptiles of Canada, a subject to which but little attention has yet been given in this country, but one in which there is a large and promising field for the enterprising investigator. To all lovers of sport, either with the rod or gun, this journal will commend itself. It should also be of value to all who are fond of natural history in general. We hope to see it liberally supported. The subscription price is one dollar per annum.

BUTTERFLIES: THEIR STRUCTURE, CHANGES AND LIFE HISTORIES. By Samuel H. Scudder.

We are indebted to the author for a copy of this beautiful book, a well-printed octavo volume of 322 pp., illustrated with 201 figures. The work is divided into thirteen chapters, the first six of which treat of the structure of butterflies in all the stages of their growth from the egg to the perfect insect. A chapter is devoted to the internal organs of caterpillars, and another to the transformation of these organs during growth. The remaining chapters deal with the life histories of these attractive insects and the changes which they undergo under varying circumstances. Following these is an Appendix containing instructions for collecting and preserving insects, etc., a list of the common and scientific names of butterflies, and a list also of the food plants of their caterpillars, all written in a plain and popular style. It is a great pity that a work of this character, coming from so well-known and talented an author, and containing as it does so much useful and valuable information, should be marred by the introduction of a series of new names for our butterflies, which, to the great bulk of the Entomologists of America, seems to be a most unreasonable imposition, and against which there is a general feeling of revolt. That any author should persist in carrying the rules of priority so far as to resurrect old documents, the authority of which is of the most questionable value, and on the strength of these insist on the changing of nearly all the names of our butterflies, is a tax on the patience of the practical man which few can endure, and a serious bar to the progress of our favourite science. Neither do we think that the introduction of a large number of newly-invented common names will add in any degree to the popularity of Entomology; it were far better, in our opinion (with few exceptions), to use the specific name of the insect for this purpose, which is as easily learnt and conveys a more definite idea than is possible with such common names as those given by this author.

PAPILIO.

This valuable monthly serial, devoted entirely to Lepidoptera, has now reached its ninth number, with an average of about 20 pages per number. It is the organ of the New York Entomological Club, is well got up as to printing and paper, and is edited by the Secretary of the Club, Mr. Henry Edwards. A large portion of its space is devoted to descriptive Entomology, with occasional papers relating to the life history of species. In the September number, among other interesting papers, we find one by Mr. W. H. Edwards on the alleged abnormal peculiarities of *Argynnis myrina*, which was read before the Subsection of Entomology at the recent meeting of the American Association at Cincinnati. In this paper the author shows from records of careful observation that many of the remarkable statements made by Mr. Scudder on the abnormal peculiarities of this insect are incorrect. In the October number is a full description of the preparatory stages of *Thecla Henrici*, by the same author; notes on an Aquatic Noctuid Larva, by J. H. Comstock; and descriptive papers by A. R. Grote, B. Neumoegen and Henry Edwards.

BULLETIN No. 6, FROM THE DEPARTMENT OF THE INTERIOR, U. S. ENTOMOLOGICAL COMMISSION; being a General Index and Supplement to the Nine Reports of the Insects of Missouri. By C. V. Riley; 8vo., pp. 177.

This useful pamphlet will add much to the value of the Missouri Reports, containing as it does a very complete index to all the matters contained therein. Following the introduction we have tables of the contents of the nine reports, then a list of errata, followed by a few pages of notes and additions; then follow descriptions of new species, descriptions of adolescent states, lists of illustrations, a copious general index and an index to plants and food plants.

ON THE GENERA OF CARABIDÆ, with Special Reference to the Fauna of Boreal America.
By George H. Horn, M.D. From the Transactions of the American Entomological Society, October, 1881; 105 pp., with eight plates.

In this paper the author dwells at some length on the value of the modifications of various organs of the body in the Carabidæ, for the purposes of classification, following with a complete classification of the tribes in this order, the points of difference being illustrated by examples in the excellent plates which accompany the text. Throughout this work there are many tables wherein the main points of difference are grouped in such a manner as to enable the student to readily recognize the many genera into which our numerous species are divided. This addition to our Entomological literature will prove a great help to Coleopterists, and only those who know the extent of this subject will be able to estimate the amount of labour and careful study required to produce such a work as that we have before us.

THE HONEY ANTS AND THE OCCIDENT ANTS. By Henry C. McCook, D.D.; 8vo., pp. 188, illustrated with thirteen plates. 1882.

This work, in the words of the author, is "a monograph of the architecture and habits of the honey-bearing ant, *Myrmecocystus melliger*, with notes upon the anatomy and physiology of the alimentary canal; together with a natural history of the Occident harvesting ants or stone-mound builders of the American plains." It is written in a charming and popular style, and the details of the curious habits of these interesting creatures are given in such a manner as to show that the author has studied them closely, and is quite familiar with every aspect of the subject treated of, while the beautiful illustrations are a material aid towards the ready comprehension of the whole matter. This work is well worthy of a place in the library of every student of nature.

A MANUAL OF INJURIOUS INSECTS, with Methods of Prevention, and Remedy for their Attacks to Food Crops, Forest Trees and Fruit, and with a short Introduction to Entomology. By Eleanor A. Ormerod, F.M.S., London, England. 1881.

It is with very great pleasure that we draw attention to Miss Ormerod's excellent work on Injurious Insects—the full title to which we have given above. It is the first effort that has been made in England to bring within the reach and comprehension of ordinary farmers and gardeners a complete account of the insect enemies that they have to deal with. The work begins with an introduction to Entomology, in which the reader is furnished with an account of the general life-history of insects during the various stages of their existence, beginning with the egg and going on through the larva and pupa to the imago. This is followed by a sketch of the classification of insects, based upon Prof. Westwood's division into thirteen orders, each of which is represented by wood-cuts of common species, in order that it may be easily recognised by the reader. The book is divided into three parts, viz., Food Crops, Forest Trees and Fruit, with the insects that injure them respectively. In each part the various crops, trees, etc., are treated of as regards their insect enemies, in alphabetical order; for instance, the "Food Crops" begin with the Asparagus, Bean, etc., and end with Turnips, thus making it very easy to obtain information about any insect that happens to be prevalent. Every insect treated of in the book is made easily recognisable to the non-scientific reader by means of admirable wood-cuts, partly the work of the talented authoress herself, and partly reproductions of the beautiful illustrations in Curtis' Farm Insects. Each cut shows the insect in the various stages of its existence, while the letterpress gives an account of its life history. As an example of Miss Ormerod's work, we give two illustrations selected almost at random.

P. 1, ASPARAGUS BEETLE—*Crioceris asparagi*, Linn.

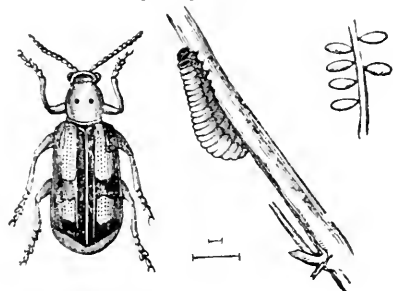


Fig. 10.

Asparagus Beetle, larva and egg; all magnified. Natural length of egg and beetle shown by lines.

P. 123, ONION FLY—*Anthomyia ceparum*, Bouché.

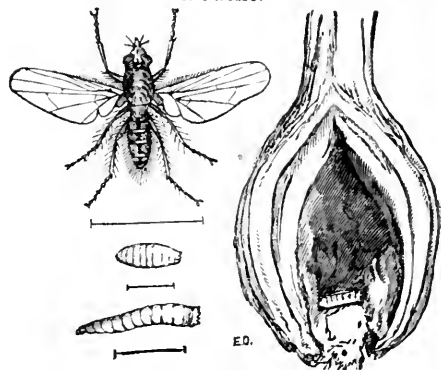


Fig. 11.

Onion Fly, pupa and larva, all magnified. Onion-bulb showing pupa remaining in stored onion.

We cannot but congratulate Miss Ormerod upon the skilful manner in which she has accomplished her task, and we trust that her work will be fully appreciated by the farmers and gardeners of Great Britain, for whose special benefit it has been produced. The whole book is written in clear, simple language, free from all scientific terms and technicalities so far as they can be omitted, while the modes of prevention are such as have been practically tested by competent persons, and cannot fail to be beneficial if intelligently followed. We hope to see many editions of the work called for, and to learn that the authoress has been amply rewarded for her labour of love.—C. J. S. B.

REPORTS OF THE U. S. COMMISSIONER OF AGRICULTURE FOR 1878 AND 1879.

We have lately received copies of both of these valuable reports from the Department of Agriculture at Washington. There are in them—in addition to all the other useful papers on subjects relating to agriculture—in the reports of the Entomologist of the Department, much that is of great interest to entomologists. In the report for 1878 we have, from the pen of C. V. Riley, contributions on the insects injurious to the cotton plant; the silk worm, with instructions for the production of silk; with descriptions also of a number of insects injurious to fruits and field crops, occupying in all 50 pages, and illustrated by seven full-page plates. In 1879, papers by J. H. Comstock on the army worm, clover insects, insects injurious to the orange tree, and references to many other species which injure field crops, forest and fruit trees, covering 75 pages, and illustrated by six full-page plates. This volume also contains an extensive report on insects injurious to the cotton plant; 84 pp., with 9 plates.

NORTH AMERICAN MOTHS; with a Preliminary Catalogue of Species of *Hadena* and *Polia*.
By A. R. Grote; 8vo., 20 pp., from the Bulletin of the Geological and Geographical Survey of the U. S., Vol. VI., No. 2.

In addition to the catalogues and other useful matter, this paper contains descriptions of twenty-eight new species.

THE INSECTS OF THE CLOVER PLANT. By J. A. Lintner; 8vo., 17 pp., with 6 cuts.

This excellent paper forms part of the Fortieth Annual Report of the New York State Agricultural Society, and contains detailed descriptions of the insects most destructive to clover, with references to all the species known to feed on this plant.

OTTAWA FIELD NATURALISTS' CLUB.

The second volume of the Transactions of this active body of naturalists is at hand. It is a neat pamphlet of 44 pages octavo, with one excellent plate illustrating a new species of *Porrocrinus* from the Trenton limestone, accompanied by a description, with some remarks on the genus by Dr. James Grant. In addition to the Annual Report of the Club, the volume contains the inaugural address of the talented president, James Fletcher, Esq.; a paper on Some Coleoptera Injurious to our Pines, by W. H. Harrington; one by Prof. J. Macoun on the Capabilities of the Prairie Lands of the Great North-West, as shown by their Fauna and Flora; and other interesting contributions. We congratulate our Ottawa friends on the good work they have done this year, and sincerely hope that their active efforts may have the effect of promoting a general love for natural history among the residents of the capital of our Dominion.

INSECTS INJURIOUS TO CLOVER.

By WM. SAUNDERS, LONDON, ONT.

1. THE CLOVER SEED MIDGE—*Cecidomyia leguminicola*.
2. THE CLOVER ROOT BORER—*Hylastes trifolii*.
3. THE CLOVER STEM BORER—*Languria Mozardi*.
4. THE CLOVER LEAF MIDGE—*Cecidomyia trifolii*.
5. THE CLOVER HAY WORM—*Asopia costalis*.
6. THE CLOVER DRASTERIA—*Drasteria erechtea*.
7. THE CLOUDED SULPHUR BUTTERFLY.—*Colias philodice*.

There are many insects which injuriously affect this important crop, but it is only within the past three or four years that special attention has been paid to them. Within this period they have been closely studied, both in the field and in confinement, by men in every way qualified for the work; by the Entomologists of the Department of Agriculture in Washington, Professors Riley and Comstock; by the State Entomologist of New York, Prof. J. A. Lintner of Albany, and others. From the several valuable reports issued by these Government and State officials, much of what follows has been gleaned; and the object aimed at here is to present the information obtainable in a popular manner, to incorporate with it such additional facts in reference to the occurrence of these insects in Ontario as our limited opportunities for observation have enabled us to acquire, and to present all in as convenient a form for reference as possible, so as to make this part of our report of special value to our agricultural readers.

In a late paper on Clover Insects, published by Mr. Lintner, he enumerates no less than forty-six injurious species, about half of which are known to occur in Canada. The injury done by some of these is insignificant, either on account of the insects feeding on many other plants besides clover, or else for the reason that these species seldom occur in any remarkable abundance; while, on the other hand, there are included in this list several insects which have already become, or promise to become, formidable foes to this crop; and amongst the latter, none are attracting so much attention as the Clover Seed Midge, an insect which has fairly established itself in our country, and is likely to prove a serious drawback to the growth of clover seed in our Province. This species will first claim our attention.

THE CLOVER SEED MIDGE—*Cecidomyia leguminicola*, Lint.

The first mention we have of this serious pest is in an article published in the organ of our Entomological Society of Ontario, the *Canadian Entomologist*, in March, 1879, contributed by Professor Lintner. Under the heading of "A New Insect Pest," he says: "In the summer of 1877 my attention was called to some 'worms' which had been discovered in the heads of red clover (*Trifolium pratense*), and were said to be preying upon the seeds. They were found to be minute maggot-like creatures hidden within the seed-pods, and entirely destroying the seeds which they attacked. Numbers of them were subsequently detected in the examination of heads of clover taken from several localities in the vicinity of Albany and in Warren County, N.Y. I was unable at the time to refer the insect to any described species, or to find any record of a similar depredation on clover seeds in this country or in Europe.

"The following season (1878), additional examples of infested clover heads were submitted to me which had been sent from Mr. George W. Hoffman, President of the New York State Agricultural Society, from Elmira, N.Y. A number of the larvæ were obtained from these heads, and their careful examination enabled me to refer them to the *Cecidomyia*—of a species probably closely related to the well-known Wheat Midge (*Cecidomyia destructor*). Several of the larvæ were preserved in alcohol, and the larger number placed in a pot of damp sand, in which they speedily buried themselves for their transformation." These larvæ were of a pinkish colour, approaching orange, and about one-twelfth of an inch long. In January of the same year, Prof. Lintner had announced the appearance of this new destructive insect at the Annual Meeting of the New York State Agricultural Society, and the discussion which followed brought out the information that this insect had committed serious depredations on clover seed in several counties in western New York during the previous summer, so that fields in some sections which had been kept for seed proved to be scarcely worth cutting. In July of the same year, Mr. Lintner, in another communication to the *Canadian Entomologist*, announced the discovery of the perfect insect which he had reared, and it proved to be—as he supposed it would—a small fly, a species of *Cecidomyia*, to which he subsequently gave the name of *leguminicola*. Observations since made enable us to complete its history.

HOW IT SPENDS THE WINTER.

The insect passes the winter in the pupa or chrysalis state either on or under the surface of the ground, and early in spring the fly escapes, when the sexes pair and the female soon becomes ready to deposit her eggs.

THE EGG.

The female, by means of a long ovipositor (see fig. 13, c), pushes the eggs down the hairy tubes of the undeveloped flowers in the young clover heads almost as soon as the flowers begin to form, which in Ontario would be during the early part of May. The eggs are so small that it is almost impossible to discover them with the naked eye, their length not exceeding the hundredth part of an inch. They are of a long, oval form, three times as long as broad, with one end slightly larger than the other. They are of a pale-yellow colour when first laid, but become tinted with orange as the larva within matures; they are usually deposited singly, but sometimes in clusters of from two to five—as many as fifty eggs have been counted in a single flower head. No estimate has yet been made, to my knowledge, of the number of eggs which a single individual is capable of producing, but doubtless this insect is very prolific. In about ten days the eggs hatch, when the young larva works its way down the tube of the flower to the seed, upon which it feeds.

THE LARVA, OR GRUB.

The larvæ when full grown are about one-twelfth of an inch long, usually of a bright orange-red colour, occasionally paler and sometimes almost white. They are footless, and have a wriggling, worm-like motion; they affect the clover heads in the same manner that

the Wheat Midge affects the wheat, and when mature they leave the clover heads, drop to the ground, and either work themselves a short distance under the ground or hide amongst dead leaves or other rubbish on the surface, and there enter upon the pupal stage of their existence. Figure 12 represents the larva highly magnified, the hair line at the side showing the natural size; at *b* the head is shown retracted, and more highly magnified.



Fig. 12.

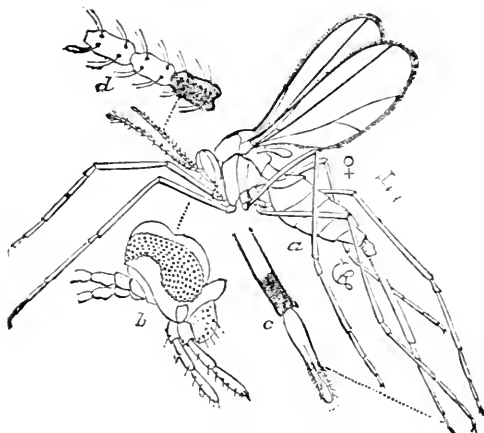


Fig. 13.

THE PUPA, OR CHRYSALIS.

Each larva having fixed on a suitable location, spins for itself an oval, compressed, rather tough cocoon of fine silk, with particles of earth or other material adhering to the outside, which makes it extremely difficult to discover them. Within this enclosure the larva changes to a chrysalis, which is of a pale orange colour with brown eyes; on the front of the head are two short conical tubercles, and behind these two long bristles. The sheaths in which the antennæ are concealed are curved outward, much like the handles of an urn. The duration of the pupa state of the early brood is about ten days. When the fly is about to emerge, the chrysalis works its way out of the cocoon to the surface, and then opening the fly escapes.

THE FLY.

The perfect insect is a minute two-winged fly, about the size and general appearance of the common Wheat Midge. The head is black; the antennæ long, yellowish-red, with sixteen or seventeen joints in the female and fifteen in the male. Wings nearly transparent, clothed with many short curved blackish hairs, which give them a dusky appearance; each wing has three longitudinal veins, the third either forming a fork, or else becoming more or less obsolete towards the tip. Hairy fringe of wings, paler and composed of longer hairs than those on surface of wing. Abdomen fuscous, with black hairs above on each segment; thorax black, and clothed with rather long hairs. The male has an extended pair of clasping organs on the hinder extremity; the female a long pointed ovipositor, about twice the length of the abdomen.

Figure 13 represents the female fly with her four-pointed ovipositor extended; at *a* we have a more highly magnified view of the tip of the ovipositor, clothed at its extremity with short hairs. At *b* we have the head highly magnified, to show the structure of the eye, the four jointed palpi and the basal joints of the antennæ; at *d* we have a portion of one of the antennæ much enlarged. The small lines at the right give the natural size of the midge.

Figure 14 shows the male fly similarly enlarged, with highly magnified representations of the head at *b*, the peculiar clasping organs at *c*; the pedunculated joints of the antennæ at *e*, which are more rounded and hairy than those of the female. At *e* the claws

at the tops of the legs are shown ; and at *f*, forms of the scales which are distributed over the wings and body.

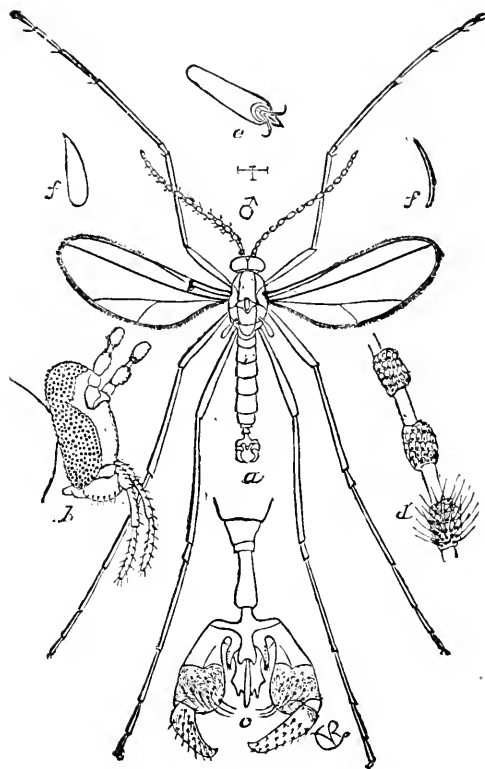


Fig. 14.

For the above figures, as also for those of 12, 15, 16 and 17, we are indebted to the kindness of Prof. J. A. Lintner, of Albany ; 12, 13, 14 and 15 are from drawings made by Prof. C. V. Riley ; 16 and 17 from drawings by Prof. J. H. Comstock.

NUMBER OF BROODS.

There are certainly two and probably three broods in a season in the State of New York ; flies of the first brood make their appearance in the latter part of May, and larvæ may be found full-grown in the clover heads early in July ; during August the flies are again on the wing, and the next crop of larvæ are full-grown in September. In Washington three broods have been observed in the season ; the full-grown larvæ of the first brood enter the ground by the 23rd of May, flies issuing from these early in June, which laid eggs from which larvæ matured, and flies again appeared in September. The flies of the later brood begin to issue in September, and continue to escape all through the mild autumn weather, and some remain in the chrysalis state until the following spring. From earth taken from the surface of an infested clover-field, and kept in a warm room, the flies have been found to escape throughout the winter.

LOCALITIES AFFECTED.

This troublesome pest is now very generally distributed over the State of New York, and has lately been observed in Vermont ; it has also been found in the district of Columbia and across the river in Virginia, where the clover crops have suffered from this cause ; it has also been found in Pennsylvania. Although not yet reported from

the territory lying between the points mentioned, it is very probable that it has spread over the whole of it. In Ontario it has been found along the line of the Canada Southern Railway, also in the neighbourhood of Hamilton. At the Annual Meeting of the Entomological Society, held in London in September last, Mr. William Weld, editor of the *Farmer's Advocate*, stated that he had recently received clover heads from several correspondents infested with an insect which he believed to be this Clover Midge. Mr. Charles Arnold, of Paris, Ont., also thought, from what he had heard from those growing clover in his vicinity, that the insect was injuring the crop there, and promised to send some specimens to the writer on his return home if he could find them. On the 1st of October I received from Mr. Arnold a small box with some heads of red clover, in which I found a considerable number of full-grown larvæ of the Clover Midge, thus establishing the fact of its occurrence in that central district of Ontario. Mr. Arnold reports that the insect has done a considerable amount of injury in his locality.

A SOURCE OF SERIOUS DANGER.

I have lately received from Mr. L. T. Drouse, of Camden, New Jersey, the manuscript of a paper read by him before the Microscopical Society of Camden, in which he called attention to the fact of living specimens of this larva being found abundantly in clover seed offered for sale, and exhibited under the microscope specimens of the larva so obtained. He stated that these larvæ were found in a lot of clover seed which was sent to Wilson, Fitzgerald & Co., seed dealers, of Camden, N.J., from the upper part of Pennsylvania. These dealers, in the course of their examination of this clover seed by sifting, etc., with the view of ascertaining how far it was contaminated with foul seeds, were surprised to find a quantity of these larvæ distributed throughout the seed. Samples of the infested seed were at once sent to Prof. George H. Cook, Director of the New Jersey Experimental Station, who submitted them to Mr. A. S. Fuller, of Ridgewood, N.J., and he identified them as the larvæ of the Clover Midge. Subsequently specimens of the insect were sent to Prof. C. V. Riley, of Washington, Entomologist of the Department of Agriculture, and, although they were dead when they reached him, he had no difficulty in recognising them as specimens of this injurious insect. In view of these facts, it is of the utmost importance that farmers exercise the greatest caution in the purchase of clover seed, else, while sowing their seed, they may at the same time be sowing an enemy that will to a greater or less extent destroy the crop. Seedsmen also should exercise great care, otherwise they may be the means of seriously injuring the clover growers in their district by the introduction and dissemination of this pest.

IMPORTANCE OF THE STUDY OF ENTOMOLOGY.

The importance of the study of Entomology will, in this connection, be apparent to everyone, since it places the farmer on his guard against an enemy which may inflict on his crops untold damage, and such a word of caution may save the agricultural community many thousands of dollars. At a recent meeting of the Farmers' Club, of Onondago County, N.Y., Prof. Lintner made the following remarks:—"Occasionally at the present day we may hear insects and entomologists spoken of as 'bugs' and 'bug-hunters,' epithets applied in derision to what are regarded as petty objects and trivial pursuits. Such views only betray an ignorance which is equally pitiable and inexcusable. The study of insects has assumed an importance in its direct application to agriculture, horticulture and sylviculture, second to no other department of natural history. It has called to its aid some of the best intellect of the country, and its literature has become extensive and assumed a high rank. Our State governments, in response to demands made upon them, are appointing State entomologists; our general Government is making liberal appropriations for entomological work in the Department of Agriculture at Washington, and also for sustaining a special United States Entomological Commission, now in the third year of its operations, charged with the investigation of a few of our more injurious insects. The study of insects assumes an importance in this country greater than in any other part of the world. Nowhere else does Mother Earth yield in such variety and in

such abundance her agricultural products; after supplying to repletion our own people, the excess is distributed to every quarter of the globe. Few of these varied products are native to our soil. Nearly all of our fruits, grasses, cereals and vegetables are of foreign importation, mainly from Europe. With their introduction many of the insects that preyed upon them were also introduced, or have been subsequently brought hither, but, unfortunately for us, the parasites which preyed upon them and kept them under control have for the most part been left behind. As the result, the imported pests in their new home find their favourite food-plants spread out in luxuriant growth over broad acres, where they may ply their destructive work without hindrance or molestation until some native parasites acquire the habit of preying upon them. Every crop cultivated on a large scale offers strong invitation to insect attack, and wonderfully stimulates insect multiplication."

HOW TO TREAT INFESTED CLOVER SEED.

Should any of our readers find themselves in possession of infested seed, the larvæ may be destroyed by heating the seed with constant agitation in a vessel freely exposed to the air for an hour or two, which will cause the grubs to dry up and perish. Seed may be heated in this way to a degree unpleasantly hot for the hand without injury. It has also been suggested to enclose the seed in tight barrels and pour some benzine on it. If the barrels were only partly full, and the seed agitated to disseminate the benzine throughout the mass, this remedy would probably be efficient in destroying the larvæ; but a little of this liquid poured on the top of a full barrel, being very light and volatile, would soon escape through the minute crevices of the barrel, and scarcely find its way to any extent through the compact mass of seed. Chloroform or bisulphide of carbon would perhaps answer a better purpose; their vapours, being heavier than the air, would penetrate downwards, while benzine, being much lighter than air, would escape upwards. Camphor has also been suggested, but it is not likely that this substance would produce any effect whatever.

REMEDIES.

Where this insect has become fairly established and is doing much damage, there seems to be but one method of subduing it, and that is, for the farmers in such a district to cease growing clover for a year or two, and thus in a measure starve the insect out. This plan, however, would not be likely to entirely eradicate the evil, since it is known that the insect sometimes attacks the white clover which grows everywhere as a weed. If farmers in infested districts would cut their clover earlier than usual, just as it is coming into bloom, and while the larvæ are young, most of them would perish; and this might be accomplished at the expense of but a slight reduction in the value of the hay crop, while the prospects for a crop of seed in the autumn would be comparatively good. The more generally this plan was adopted the better the results would be; indeed, united effort in this direction would be essential in order to accomplish much, and at the same time care should be taken to leave no clover uncut in fence corners or other out-of-the-way places.

INSECT PARASITES.

Small as this insect pest is, there are insects still smaller which are parasites on it. Two distinct species of these diminutive friends have been observed and their work recorded by J. H. Comstock, in the Report of the Commissioner of Agriculture at Washington. They are both very minute four-winged flies; one is very nearly related to the celebrated Joint Worm Fly (*Isosoma hordei*), and has received the name of the Funereal Eurytoma (*Eurytoma funebris*); the other is a species of *Platygaster*, known as *Platygaster error*, Fitch. The first feeds on the larva of the clover seed midge while it is in the clover seed capsule; undergoes all its transformations within the seed vessel, making its exit as a fly through an irregular hole gnawed through the side, just large enough to permit of its escape. This parasite is found emerging just about or shortly after the time when the crop of midge larvæ leave the clover heads to go into the ground. It has been found in abundance about Washington, where the first specimens were observed on the

3rd of May; from that date until the end of June they were very abundant, and from the careful examination of many seed-heads towards the end of that month it was estimated that, while five-sixths of the clover seed had been destroyed by the midges, four-fifths of the midges had been destroyed by this parasite. Thus through the good offices of this one species of parasite the prospective numbers of the next brood of midges were reduced to the extent of 80 per cent.

The second parasite, *P. error*, develops more slowly, and remains within the body of the midge larva until after it has escaped from the clover head, entered the ground, and spun its cocoon; then the full-grown parasite, having destroyed its host, eats its way through the cocoon and escapes. This has been found as yet only in specimens of the midge larva received from Yates County, New York State.

THE CLOVER ROOT-BORER—*Hylastes trifolii*, Muller.

This is another new pest—a small beetle about one-twelfth of an inch long, belonging to the family usually known as Bark-borers, *Scolytidae*, from their habit of boring irregular channels through the inner bark of various trees. This species, however, is a root-borer. The beetle is of a reddish-brown colour, coarsely punctured on the body, not so coarsely punctured on the head and thorax, with the whole body more or less hairy. They usually reach maturity in October; and the beetles hibernate in the root and probably live upon the root. Early in spring they leave their hiding-places, and, after pairing, the female proceeds to deposit her eggs.

The insect in its various stages is represented in the accompanying figure, 15: *a* shows the beetle; *b*, the larva as found in the burrows; *c*, the pupa, which is usually found lodged in a cavity at the bottom of the burrow; the figures are about ten times their natural size. At *a a a*, the destructive work of the larvæ on the roots of the clover is shown.

HOW AND WHERE THE EGG IS DEPOSITED.

The female bores a large cavity in the crown of the root, and there deposits from four to six pale-whitish elliptical eggs, which hatch in about a week.

THE LARVA, OR GRUB.

The young larvæ at first feed in the cavity made by the parent until it is enlarged to the size of a small pea; then they begin to gnaw sideways and downwards, probably because the lower and more tender portions of the root are more suitable for their nourishment than the upper woody portions. The burrows run in a nearly straight line, and lie between the outer skin and the woody centre of the root, and are filled with black excremental dust. When full-grown the larva (*b*, fig. 15) is a little over one-eighth of an inch long, of a dingy white colour, with a pale yellow head and brown mandibles. Although the perfect beetle is believed to feed on the clover roots, it is in the larval condition that this insect is most destructive, working more particularly on the larger roots—in many instances entirely severing them at the surface of the ground—and this to such an extent that at times it is found extremely difficult to cut the clover, owing to the ease with which the plant is pulled up before the mower. Up to the time of frost Prof. Riley has found the insect in all stages of growth, but at this time the perfect beetles are most numerous.

THE PUPA, OR CHRYSALIS.

The pupa (*c*, fig. 15) occupies a smooth cavity at the end of the gallery or chamber excavated by the larva. Here, at the end of September, it is to be found with its head upwards, and if the season is favourable most of the beetles escape in October.

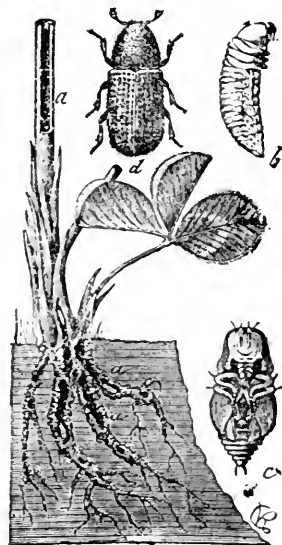


Fig. 15.

LOCALITIES INFESTED.

This insect is found in Europe, from whence it has probably been brought to this country, but it is not very common there, and is not usually spoken of as a serious clover pest. In America, however, it has become quite formidable. It was first brought to the notice of Prof. Riley in the autumn of 1878, from specimens discovered in Yates County, N.Y., and has proved quite destructive there as well as in several other counties in that State. A correspondent in the *American Entomologist*, Vol. III., p. 227, writing in 1880, says: "It has taken all the clover in parts of Genesee County. In half a dozen clover fields examined within a ride of ten miles, every plant pulled up was found to be more or less injured by it." It is during the second year that injury to the clover plant by this insect is most observed.

REMEDIES.

No better remedy is yet known than to plough infested fields in the spring of the third year of the clover, at which time the insect is most abundant, and by general agreement throughout the more seriously infested districts to refrain from the culture of clover for two or three years. It is not as yet known that any special parasite is attacking this insect, but Mr. Riley on one occasion found the larva of a beetle, a species of *Telephorus*, preying on it. We have not yet heard of this pest occurring in Ontario, but we cannot expect to be long free from it if it continues to spread among our near neighbours.

THE CLOVER-STEM BORER—*Languria Mozardi*.

This insect infests the stem of the clover plant, burrowing in it, and either materially weakening it or killing it outright. It occurs throughout the greater portion of the United States, and is also found in Canada. It is, however, a rather rare insect, and one scarcely likely to prove very troublesome, on account of its rarity. It has been bred by Prof. Comstock, of the Department of Agriculture in Washington, who has carefully recorded its habits and changes in the several stages of its existence, and to him we are indebted for the following facts in its history:—

The eggs are laid in the stems of the clover, in holes gnawed by the parent insect; they are about one-sixteenth of an inch long (see fig. 16), of a yellowish colour, rounded at both ends and somewhat curved. They will usually be found imbedded in the pith of the stem. The egg is generally laid high up in the stem, and the young, slender, worm-like larvæ burrow downwards, consuming the central substance of the stem during their growth to the extent of from six to eight inches. The full-grown larva (shown at the extreme right in fig. 16) is more than three-tenths of an inch long, of a yellow colour, with six prominent thoracic legs and a prop-leg at the posterior end of the body. The last segment of the body has two stiff spines above, slightly curved upwards.

The larva changes to a chrysalis (see fig. 16) in the lower part of its burrow. The time of the pupal state varies much in its duration; the beetles begin to issue in August, and continue to emerge until late in October. There is probably but one brood of the insect in a season, the insect hibernating for the winter in the beetle state.

The beetle (fig. 16) is slender and cylindrical, with a yellowish-red thorax. The wing-covers are bluish-black with a green tinge, and are marked with deeply-impressed punctures arranged in regular rows. In fig. 16 the insect is represented in its various stages, together with the work of the larva within the stem. Prof. Comstock has found two species of parasites within the burrows of the stalk-borers—the one a small, black chalcid fly, the dark, naked pupa of which was often met with; and the other a yellowish ichneumon, the pupa of which was enclosed in a delicate white silken cocoon. Possibly

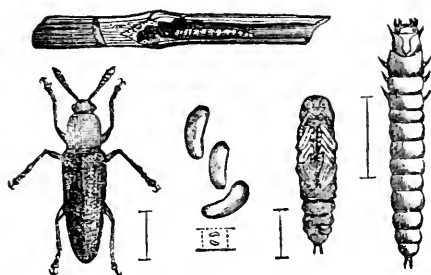


Fig. 16.

we are indebted to the unceasing vigilance of these tiny insect friends for the comparative rarity of this insect pest.

THE CLOVER-LEAF MIDGE—*Cecidomyia trifolii*.

This is a European insect which has been recently discovered in this country. It has been studied at the Department of Agriculture in Washington, and reported on by Prof. Comstock. Although we are not aware of its occurrence as yet in Canada, we submit a brief sketch of its history condensed from the report of the entomologist at Washington.

It attacks the leaf of the clover, and in fig. 17 we have represented the folded leaves containing the larvæ, a partially-opened leaf-case showing the cocoons attached to the leaf, and the larva and female midge both enlarged.

The fly so closely resembles the clover seed midge that it can scarcely be distinguished from it excepting by critical examination; it is a little smaller in size, and the female has two joints less in her antennæ. It attacks both the red and white clover.

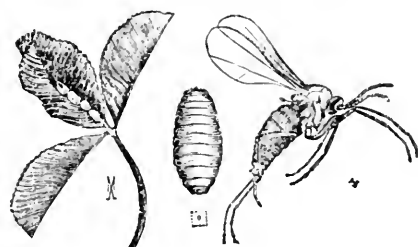


Fig. 17.

About the middle of June is the time when the larva is found; it folds the leaflets together upon the mid-rib so that the two edges almost coincide. The under side of the folded leaves turn yellow or brownish, and upon opening them they are found to contain from one to twenty whitish or pale orange-coloured larvæ, much like those of the clover seed midge, but somewhat smaller and paler in colour, with the whole surface of the body coarsely granulated. Within the folds the larvæ change to chrysalids, enclosed in delicate white oval cocoons fastened to the sides of the leaf. The enclosed chrysalis is of a pale orange colour, with a median ventral stripe of a darker shade.

This insect is not yet reported as occurring in any other locality than Washington; should it much extend its operations and become generally common, or even abundant, it is not likely, from the nature of the injury it causes, ever to become a serious injury to the clover crop. It has never been known to injure clover to any serious extent in Europe.

THE CLOVER HAY WORM—*Asopia costalis*.

This pretty little moth, which is represented of natural size in fig. 18 at No. 5, with its wings expanded (No. 6 wings closed), is frequently seen during the summer months, often finding its way into our dwellings. It is not active during the middle of the day unless in very dull and cloudy weather, but towards evening it is on the wing, and then may often be met with in numbers, flitting around in the neighbourhood of clover stacks. When its wings are spread it measures about eight-tenths of an inch across. The fore wings are of a reddish or purplish-brown hue, with a greyish tint over all and a silky gloss. Along the front margin there are two large, bright golden-yellow spots, dividing each wing into three nearly equal parts; the outer spot is the larger of the two, and from each there extends a lilac-coloured line back to the hind margin; the hind-wings are lighter in colour, with two pale, wavy, transverse lines; both wings margined with deep orange and fringed with golden-yellow; under surface paler, with the markings less distinct. In fig. 18 the

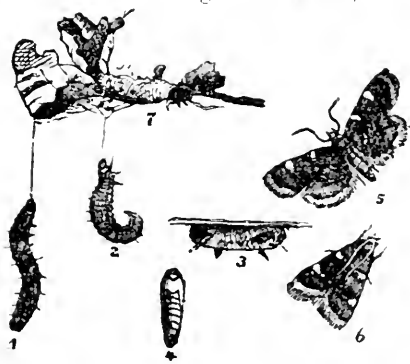


Fig. 18.

larva is shown at 1 and 2, at 7 the same enclosed in its silken web, the cocoon at 3, the chrysalis at 4, and the perfect insect at 5 and 6.

THE EGG.

The eggs are fastened to such clover as the females can find access to by creeping into the crevices and small openings in the stack. In a few days during the summer the larva is hatched.

THE LARVA.

The full-grown larva measures nearly three-quarters of an inch in length, tapering each way, with the body much wrinkled, and is of a dark, olivaceous-brown colour, with several smooth, shining dots on each segment, each giving rise to a fine, whitish hair. The young larvæ are paler in colour, and occasionally specimens will be found which, even at maturity, retain this lighter colour. They usually dwell within a cylinder of silk of their own constructing, and from this issue to feed on the dry clover. They are very active in their movements, wriggling briskly backwards as well as forwards, and are often found lively late in the season, with the thermometer down to the freezing point. Each larva has the power of readily spinning a silken thread, by means of which it suspends itself in mid-air, and where these larvæ are abundant in a barn, they sometimes hang in this way in such numbers from the timbers of the building as to be a source of great annoyance to passers-by.

THE PUPA.

When full-grown, the larva seeks some sheltered spot in which to pass the chrysalis state of its existence, and often selects the under side of a piece of board or other sheltering substance for this purpose, and there constructs an oblong oval cocoon of silk intermixed with particles of excrement and other foreign matter, and in this passes the next stage of its existence. The chrysalis is about one-third of an inch long, and of a pale yellow colour, with markings of a deeper shade.

NUMBER OF BROODS.

There are doubtless two or more broods of this insect each year.

PAST HISTORY AND MODE OF OPERATION.

This insect is one which is widely distributed. It is common in Europe, from whence it has probably been brought to this country. In Europe, however, it does not appear to have ever attracted attention as an insect injurious to clover. In this country its destructive habits have long been known and often commented on. It is abundant throughout the Eastern, Middle, and some of the Western States, as well as in Canada. It is in the larval state only that the insect is injurious. The larva does not feed on clover in its green or growing condition, but infests it in the stack or barn, and spoils it for feeding purposes by devouring its substance, interweaving it, and covering it with white silken webs and black excrement resembling grains of gunpowder. Sometimes the silken webbing is so dense as to make the hay look mouldy. It is towards the bottom of a stack that the injury is chiefly done; instances are on record where two feet or more of the lower portion has been so full of worms and cocoons as to be rendered worthless.

REMEDIES.

As the worms feed only on dry clover, they must be confined during the summer to those portions of clover hay remaining over from the previous year's making; on this account new hay should not be stacked with the old. Where clover is stacked for several years on the same foundation, the bottom layers, coming in contact with the infested leavings of the previous year, will be sure to suffer. It is also recommended to put a good log or rail foundation under the stack, so as to raise it above the surface.

THE CLOVER DRASTERIA—*Drasteria erechtea*.

This is a very common clover insect, very generally distributed, but never, as far as we know, yet reported anywhere as doing much injury to the crop. The moth is well represented in fig. 19. The moth, when its wings are expanded, will measure from an inch and a quarter to an inch and a half across. The fore wings are greyish-brown, with bands and dots of dark brown—one band crossing the wing about an eighth of an inch from the base; a second, which does not always extend entirely across, is placed midway between the first and the outer margin. There is a dull patch of brown near the front

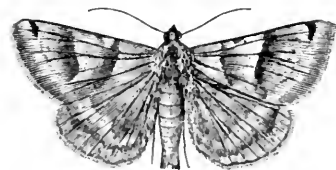


Fig. 19.

edge of the wing, between the first and second bands, and two or three prominent black dots similarly situated between the second band and the apex; the outer edge is also widely margined with brown.

The inner portion of the hind wings is of a similar colour to the front pair, the outer half being crossed by two darker bands irregular in outline, the space between them paler, as also is the space between the outside band and the hind margin. The markings on both wings vary much in intensity, being sometimes almost black, in other instances very pale. The under surfaces of both wings are much paler than the upper, with the markings of the upper side partially, but indistinctly, produced.

This insect passes the winter in the chrysalis state, and is among the earliest on the wing in spring; it is also found up to a late period in the autumn. It frequents fields, meadows, and other open grassy spots. Its flight is sudden, and after a short but rapid course it as suddenly alights.

It is in the caterpillar state that this insect feeds on clover. When full grown it measures an inch and a quarter or more. It has a medium-sized head of a reddish-brown colour, with darker longitudinal lines. The body is reddish-brown above, with many longitudinal lines, and stripes of a darker shade. There is a double whitish line down the back, with a stripe of the darker shade of brown on each side, and lower down close to the spiracles is another stripe of the same dark hue, while between these two are faint longitudinal lines. The spaces between the segments, from the fifth to the eighth inclusive, are nearly black above, a feature only seen, however, when the larva is coiled up, a position it readily assumes when disturbed. The under surface is a little darker than the upper, with many longitudinal lines of a still deeper shade, and a central stripe of blackish green from the sixth to the ninth segments. Having but three pairs of pro-legs, it alternately arches and extends its body in progression.

THE CLOUDED SULPHUR BUTTERFLY—*Colias philodice*.

The common Yellow, or Clouded Sulphur Butterfly, is found almost everywhere in its season—in fields and on roadways, often congregating in groups on the borders of streams and muddy pools, where they seem to enjoy settling on the cool moist ground.

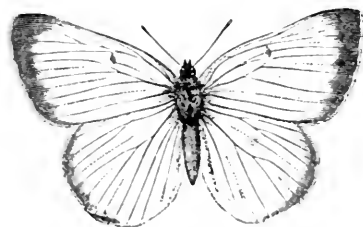


Fig. 20.

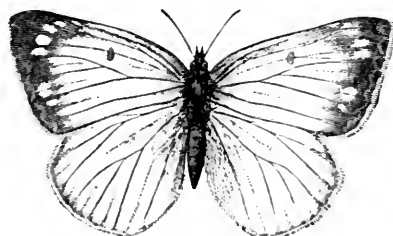


Fig. 21.

As the summer progresses, they are usually very abundant in clover fields. Figure 20 represents the male of this butterfly; fig. 21, the female—it will be seen that the sexes

differ somewhat in their markings. The ground colour of the wings in both is bright yellow, with a dark brown or blackish border, which is narrow in the male but wide in the female, and enclosing in the latter a broken row of irregular yellow spots. There is also a spot of black placed near the front edge of the fore wings, about half-way between the base and the tip, varying in form and distinctness. The hind wings in both sexes are about equally dark margined, and near the middle is a dull pale orange-coloured spot. Both wings are dusky towards the base, and the fringes are pink. The antennae are pink, with the knobs at their tips darker. The body above of a dark colour, paler at the sides and underneath.

On the under side the yellow colour is less bright, while the dark margins are either entirely wanting or represented by faint dusky shadings. The spot on the fore-wings is distinct, but paler and usually centered with a small silvery eye; that on the hind-wings is much more distinct than above, being composed of a bright silvery spot in the centre defined by a dark brown line, which is in turn encircled with dull orange. The butterfly first appears on the wing about the middle of May, but the time of its greatest abundance is during the latter part of July and throughout August.

The eggs are deposited on clover, and also on the cultivated pea and blue lupin; they are long, tapering at each end, and ribbed; of a pale lemon-yellow colour, which changes in three or four days to a pale red, then gradually to a bright red, and from that to dark brown just before hatching. The young caterpillar is of a dull yellowish-brown colour, becoming dark green as it grows older. When full grown it is about an inch long, with a dark green head and body of the same colour; the latter with a yellowish-white stripe on each side close to the under surface, with an irregular streak of bright red running through its lower portion. The body is thickly clothed with very minute hairs, giving it a downy appearance.

The chrysalis is about seven-tenths of an inch long, attached at its extremity to a mass of silken fibres spun by the caterpillar, and girt across the middle with a silken thread. Its colour is pale green with a yellowish tinge, with a purplish-red line on each side of the head, darker lines down the middle both in front and behind, and with a yellowish stripe along the sides of the hinder segments. During the warmer summer weather the chrysalis state usually lasts about ten days; a day or two before the butterfly escapes the chrysalis becomes darker and semi-transparent, the markings on the future wings showing distinctly through the enclosing membrane.

This, like the insect last described, although always common, has never yet been known to seriously injure the clover crop. There are also a number of other species which feed on clover, but as they are none of them especially injurious, it is not necessary to refer to them at present.

S P H I N G I D Æ—H A W K M O T H S.

By EDMUND BAYNES-REED, LONDON, ONT.

This family comprises some of the largest, most robust and powerful of the moths. From the strength and swiftness of their flight, they have acquired their English name of Hawk Moths. The peculiar attitude which is assumed by many of the caterpillars of the various species of these moths, gave rise to the curious supposition of a fancied resemblance to the famous Egyptian Sphinx, and hence the family received its generic name of Sphingidæ.

Dr. Thaddeus Harris, the veteran Entomologist of the State of Massachusetts, and the author of an admirable "Treatise on Some of the Insects Injurious to Vegetation," thus vividly portrays these lively denizens of the insect world:—"In the winged state the true Sphinges are known by the name of Humming-bird Moths from the sound which they make in flying, and Hawk Moths from their habit of hovering in the air while taking their food. These humming-bird or hawk moths may be seen during the morning and evening twilight flying with great swiftness from flower to flower. Their wings are

long, narrow and pointed, and are moved by powerful muscles. Their tongues, when uncoiled, are for the most part excessively long, and with them they extract the honey from the blossoms of the honeysuckle and other tubular flowers while on the wing. Other Sphinges fly during the day-time only, and in the brightest sunshine. Then it is that our large clear-winged *Sesia* make their appearance among the flowers and regale themselves with their sweets. The fragrant *Phlox* is their especial favourite. From their size and form and fan-like tails, from their brilliant colours and the manner in which they take their food, poised upon rapidly-vibrating wings above the blossoms, they might readily be mistaken for humming-birds."

The perfect insect lays its eggs singly on the leaves of the food plants of the larvæ, or caterpillars. These, when full grown, are generally of a large size; their colours are often bright, and in the several species there is a great variety and difference of ornamentation. They have eight pairs of feet, and on the back of the last segment but one there is generally a rigid spine, called the caudal horn, and in those species, where this horn is wanting, its place is taken by a tubercle. Their bodies are cylindrical, smooth and naked, and in some species are remarkable for the faculty they possess of contracting and elongating the first three segments of the body. Reference has already been made to the peculiar sphinx-like position assumed by some species of these caterpillars when at rest. Although these larvæ lead a solitary life, and do not live and move about in large numbers like the processionary caterpillars of the army worm and lackey moths, yet, from their large size, they are often capable of doing considerable injury to shrubs and plants. The number of species known is said to be between 300 and 400, most of which, however, inhabit tropical America; and as some 32 of these are known to inhabit our Province of Ontario, we have thought it desirable to give an account of each, which, we trust, may be found useful and interesting. In doing this, we have gladly availed ourselves of the various authorities on this family of moths, especially acknowledging the comprehensive monograph of the late talented Entomologist, Dr. Brakenridge Clemens, of Easton, Pennsylvania, and the synonymical catalogues of North American Sphingidæ published by Messrs. A. R. Grote and the late Coleman T. Robinson, and finally revised and completed by Mr. Grote. To this last-named gentleman our Society is indebted for the proper determination of a good many of the Sphingidæ in the collection of our Entomological Society of Ontario. Reference, moreover, must not be omitted to the labours of Mr. J. A. Lintner, the State Entomologist of New York, who has done much by the publication of his observations to promote a knowledge of the habits and life history of many of the larvæ of our Sphingidæ.

CATALOGUE OF ONTARIO SPHINGIDÆ.

Genus *HEMARIS*, *Dalman*.

1. *Diffinis*, *Boisduval*.
2. *Tenuis*, *Grote*.
3. *Marginalis*, *Grote*.

Genus *HÆMORRHAGIA*, *Grote and Robinson*.

4. *Uniformis*, *Grote*.
5. *Thysbe*, *Fabricius*.

Genus *LEPISIESIA*, *Grote*.

6. *Flavofasciata*, *Barnston*.

Genus *AMPHION*, *Hubner*.

7. *Nessus*, *Cramer*.

Genus *THYREUS*, *Swainson*.

8. *Abbotii*, *Swainson*.

Genus *DEILEPHILA*, *Ochsenheimer*.

9. *Chamænerii*, *Harris*.
10. *Lineata*, *Fabricius*.

Genus *CHÆROCAMPA*, *Duponchel*.

11. *Tersa*, *Linnaeus*.

Genus *DARAPSA*, *Walker*.

12. *Chærilus*, *Cramer*.
13. *Versicolor*, *Harris*.
14. *Myron*, *Cramer*.

Genus *PHILAMPELUS*, *Harris*.

15. *Pandorus*, *Hubner*.
16. *Achemon*, *Drury*.

Genus *PAONIAS*, *Hubner*.

17. *Myops*, *Abbot and Smith*.
18. *Excæcatus*, *Abbot and Smith*.

Genus SMERINTHUS, Latreille.

19. Geminatus, Say.

Genus CRESSONIA, Grote and Robinson.

20. Juglandis, Abbot and Smith.

Genus AMORPHA, Hubner.

21. Modesta, Harris.

Genus CERATOMIA, Harris.

22. Amyntor, Hubner.

Genus DAREMMA, Walker.

23. Undulosa, Walker.

Genus SPHINX, Linnaeus.

24. Quinquemaculata, Haworth.

25. Chersis, Hubner.

26. Drupiferarum, Abbot and Smith.

27. Kalmiae, Abbot and Smith.

28. Gordius, Cramer.

29. Eremitus, Hubner.

30. Luscitiosa, Clemens.

Genus DOLBA, Walker.

31. Hylæus, Drury.

Genus ELLEMA, Clemens.

32. Harrisii, Clemens.

1. HEMARIS DIFFINIS, Boisduval.

Sphinx fuciformis, Smith, Ab. and Sm., Ins. Ga., Vol. I., p. 85.

Macroglossa diffinis, Boisduval, Sp. Gen., Plate 15, fig. 2.

Sesia diffinis, Walker, C. B. M. Lep., Part VIII., p. 81.

Sesia diffinis, Morris, Syn. N. A. Lep., Sm. Ins., p. 148.

Sesia diffinis, Harris, Ins. Inj. Veg., p. 328.

Sesia diffinis, Clemens, Syn. N. A. Sph.

Hemaris diffinis, Grote, 1875.

Mature Larva.—Bright blue above, with the sides pale green; the under part dark reddish colour; a dark green dorsal line; a pale yellow stripe on each side. On the first segment is a transverse gold ridge, and a row of black dots on each side: the head palish blue; length, one inch and a half; caudal horn black and sharp-pointed. Feeds on the bush honeysuckle (*Diervilla trifida*) and fever wort (*Triosteum perfoliatum*), found about June and the beginning of July; spins cocoons on the ground from the leaves of their food plants, and the moths appear about a month later. The moth has the head and thorax pale yellowish-green; the breast pale yellow, with blackish hairs beneath the legs, and all the legs black; the upper part of the body has the same pale yellowish hue, inclining to black towards the extremity, which is tufted with a blackish fringe; the under side of the body is bluish-black, with pale yellow patches. The wings are transparent in the middle (from this fact these moths are known as bee-moths or clear-wings); in the fore-wings there is a narrow, dark-brownish border, the inner edge of which is *very slightly rounded and evenly scalloped on the interspaces*; the apex of the fore-wings has a red stain on the marginal band; the hind-wings are bordered with dark brown near the base, broadly on the inner margin. The colour of this species varies considerably, a warm, reddish tint being very frequently observed. Expanse 1.75 to 1.80 inch; length of body, about an inch; very common; the larvæ often stripping entirely bare the leaves of the bush honeysuckle.

Mr. Grote thus describes his definition of the species: "The species for which I use the name *Hemaris* are black and yellow-bodied, more or less fuzzy; they look like Humble-bees."

2. HEMARIS TENUIS, Grote.

The larva is, we believe, at present unknown. The species is one of Mr. Grote's determination, and very similar to *diffinis*. The moth is pale yellowish and black—the tuft at the extremity black, divided by yellow central hairs; legs black; breast pale yellowish-white; wings largely vitreous (clear), with very narrow, dull blackish borders; blackish at base, as usual, and partially overlaid with yellowish scales; costal edging narrow; the band *along the external margin is even on its inner edge and narrower throughout* than in any species hitherto described from the Atlantic District. There is

no perceptible red apical shading. The body squamation (or scaling) is rather rough, and in size it is the *smallest* of our species yet described. The external margins of the wings are more rounded and full than in any of our other known species of *Hemaris*. Expanse 1.50 inch; length of body .80 inch.

3. *HEMARIS MARGINALIS*, Grote.

The moth has the upper side of the thorax of a yellowish olive-coloured shading, the scaling becoming deep yellowish over the basal abdominal segments dorsally; middle segments black—the two last deep yellowish. The anal tuft black, with central yellowish hairs; the abdomen black; legs black: the thorax underneath is sulphur white. The body seems narrower, more fusiform, than in the other species, and the scales more depressed. Wings largely vitreous, ornamented as usual, but with a wider terminal band on the front wings than is seen in *H. diffinis*. *The inner edge of this marginal band is plainly dentate or toothed inwardly on the upper spaces.* There is a reddish apical stain as in *diffinis*. Expanse 1.65 to 1.70 inch; length of body .95 inch.

Mr. Grote thus separates these three northern species of *Hemaris*:—

Terminal band of front wings even on its inner edge—*tenuis*.

“ “ interspaceally roundedly exerted on its inner edge—*diffinis*.

“ “ interspaceally dentate on its inner edge—*marginalis*.

4. *HÆMORRHAGIA UNIFORMIS*, Grote and Robinson.

Sesia ruficaudis, Walker, C. B. M. Lep., p. 82, Part VIII.

“On the other hand, the species of *Hæmorrhagia* are Indian red and olive, with flattened body hairs, and by their form prepare us for the still more compressedly-shaped species of the genus *Ellopos*.” (*Grote*.)

Moth.—“Fawn colour; head whitish above the antennæ and beneath, with a brown band in front; the breast testaceous; abdomen deep red fawn colour at the base, with testaceous spots along each side; hind borders of segments black; apical tuft red, with some black hairs on each side; wings limpid deep red at the base, and with broad deep red borders; fore-wings deep red at the tips and with a blackish discal streak. Length of the body, 9-12 lines: of the wings, 18-24 lines.” (*Walker's description*.)

5. *HÆMORRHAGIA THYSBE*, Fabricius.

Sphinx Thysbe, Fabricius.

Sphinx Pelasgus, Cramer.

Sesia Thysbe, Fabricius.

Sesia Cimbiciformis, Stephens, Ill. Brit. Ent. Haust., Vol. I., p. 135.

Sesia Thysbe, Walker, C. B. M. Lep., Part VIII., p. 82.

Sesia Thysbe, Clemens, Syn. N. A. Sph.

Sesia Thysbe, Morris, Syn. N. A. Lep., Sm. Ins., p. 149.

Sesia Pelasgus, Harris, Ins. Inj. Veg., p. 328.

Hæmorrhagia Thysbe, Grote and Robinson, 1865.

Mature Larva.—The body tapers towards the front and is of a light yellowish-green colour, deepening on the sides; the body studded with green and yellow granulations; underneath the colour is dull rose, bordered by a buff stripe; a reddish stripe on the upper side of the body and white yellowish-green stripes on the side; the stigmata are red, with a white dot at each extremity; head granulated, dull green; when at rest partially buried beneath the first segment; caudal horn two inches long, curved, light blue, tipped with yellow and with black and white granulations; legs black, prolegs green; found in August and September; feeds on the snowball (*Viburnum Opulus*), the snow berry (*Symphoricarpos*) and hawthorn (*Crataegus*). Before going into the chrysalis state, it undergoes a marked change of colour, inclining to purplish-red and ochre-yellow. The cocoon is formed of a few leaves drawn together by a very slight spinning.

The moth has the thorax deep olive-green, mixed with brown; the breast and legs

of a light cream or yellowish-white hue; the under surface of the abdomen is bright ferruginous (rusty red), with three or four small yellowish tufts between the segments on the line separating the dorsal and ventral segments; the lateral anal tufts are black, the central reddish-brown and ferruginous beneath; the front wings are ferruginous and olivaceous towards the base; the disk is divided by a dark brown line: the broad terminal band is dark brown, with a ferruginous patch in the apical interspace; the hind wings have a bright ferruginous broad inner border, a moderately broad duller terminal band, the nervules in which are blackish. The moth appears about the same time as *H. diphis*; it is often seen in the hot sun, and at twilight flying about the blossoms of the garden phlox, the common lilac, and *Rhodora Canadensis*.

6. LEPISESIA FLAVOFASCIATA, Barnston.

Macroglossa flavofasciata, Barnston, Walker, C. B. M.
 " " Clemens, Syn. N. A. Sph.
 " " Morris, Syn. N. A. Lep., Sm. Ins., p. 151.
Lepisesia " Grote, 1865.

We give Mr. Grote's description of this moth:—

"The peculiarly neat and elegant little species, of which this genus is composed, has not been very clearly described by Mr. Walker, and we give here its more detailed description, as follows:—Black. Above the thorax and head are clothed with pale yellowish sericeous (silky), erect hair, mingled with blackish scales; laterally the palpi and the orbits of the eyes are deep black; abdomen black, with sericeous hairs above on the basal segment; anal tuft black, with lateral sericeous sub-tufts; the anterior (front) wings are blackish, with obsolete (indistinct) ornamentation; a rather broad semi-diaphanous (transparent) sub-terminal band, composed of sparse and whitish scales, extends evenly and obliquely from costa to internal margin; the terminal portion of the wing is less thickly covered with scales, acquiring a paler tinge than the basal portion; posterior (hind) wings, with a broad central fulvous fascia (tawny stripe), which contracts triangularly towards internal margin, before anal angle becoming somewhat linear and sinuate (scooped out). Beneath, the anterior wings at base are largely covered with bright fulvous squamation (scales); the central fascia on posterior wings is whitish; legs and under thoracic and abdominal regions black. Expands—male, 1.60 inch; length of body, .80 inch."

7. AMPHION NESSUS, Hubner.

Sphinx Nessus, Cramer.
Sphinx Nessus, Fabricius.
Thyreus Nessus, Walker, C. B. M. Lep., Part VIII., p. 99.
Thyreus Nessus, Clemens, Syn. N. A. Sph.
Thyreus Nessus, Morris, Syn. N. A. Lep., Sm. Ins., p. 157.

The following description by Mr. W. V. Andrews appeared in Vol. IX. of *Canadian Entomologist*, p. 19:—

"*Mature larva*, two and a half to three inches in length, tapering gently from the fourth segment to the head; colour, uniform chocolate brown, thickly dotted over the body, and particularly along the dorsal line, with dark unuber, of which colour are also the right lateral or stigmatal stripes; anal horn on eleventh segment very short, one-fifth of an inch in length; very sluggish in its movements, showing none of the irritability of *T. Abbotii* when touched. When at rest it stretches itself at full length along the leaf or leaf stem of the plant on which it feeds, never raising or retracting the anterior segments. *Pupa* dark brown; found either among rubbish on the surface of the ground or slightly beneath the surface; tongue case internal, not visible; feeds on fuchsia. *Pupa* 11th, 12th, 13th July, one moth on 8th August, two others not yet emerged, and probably will winter in the pupa state."

Moth.—Head and thorax dull ferruginous brown; breast somewhat reddish; a yellowish-white streak on the sides of the head and thorax; the abdomen a dark chestnut-

brown, with the hind margins of third and fourth segments pale yellow; three or four bright ferruginous spots on the sides; the triple anal tuft deep chestnut; the under part of the body somewhat reddish, with three white dots on the last part of the hind segments; the fore wings brown, with a purplish hue; a dark chestnut broad middle band containing a lighter coloured discal spot; dark chestnut, ferruginous, and dark brown patches; the fringes dark brown in the middle, pale yellow in the excavations and bordered by dark brown; hind-wings bright red, with a dark brown terminal band; fringes from the tip to the centre brownish, and thence to the anal angle pale yellow; flies generally at twilight, and may be seen hovering over lilac blossoms. In the *Canadian Entomologist* of August, 1874, Mr. F. C. Lowe, of Dunnville, reported that this moth was common in clover fields.

The Rev. C. J. S. Bethune, the former editor of the *Canadian Entomologist*, in the month of June, 1868, in the middle of a very hot day, observed a beautiful specimen of this moth feasting on the carcase of a dog which was floating in a filthy pool.

8. *THYREUS ABBOTII*, Swainson.

Thyreus Abbotii, Walker. C. B. M. Lep., Part VIII., page 99.

" " Clemens. Syn. N. A., Sph.

" " Morris. Syn. N. A. Lep., Sm., Ins. page 156.

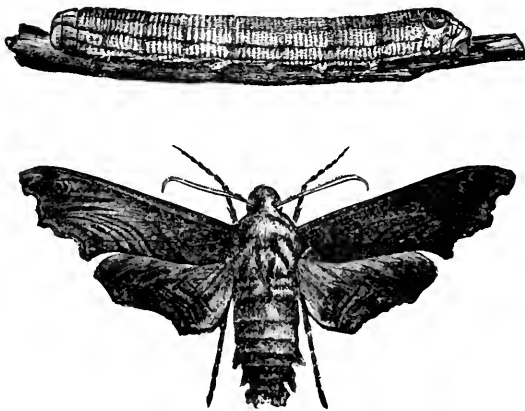


Fig. 22.

As has been pointed out by Mr. Lintner, the larva of *Thyreus Abbotii* is exceedingly interesting from the fact that its two styles of ornamentation, in marked contrast one with another, indicate the sex of the insect; being the only instance of the kind known among the butterflies and moths.

It will be noticed that the caudal horn is wanting, but its place is occupied by a polished tubercle. The larva does not assume the usual peculiar semi-erect attitude of the sphinges, but rests stretched at length, though when disturbed it shortens the front segments and throws the head from side to side, making at the same time a crepitating noise. Dr. Clemens states that when on the ground its motions under irritation are often violent. The characteristic marking of the head in both sexes distinguishes it easily, according to Mr. Riley, from its allies, being slightly roughened and dark, and a central mark down the middle often assuming the shape of an X; there being also a light broad band on each side.

The male larva is reddish-brown body, with numerous patches of light green, sometimes yellow, and on the sides a chocolate-coloured line. The tubercle is black, encircled by a yellowish line; the anal shield is pale green and brown.

Female larva has uniform reddish-brown body without any patches, so conspicuous in the male, but with broken subdorsal lines, and numerous transverse striae.

The larva feeds on the various kinds of grape vines, and on the Virginia Creeper—*Ampelopsis quinquefolia*. When full-grown it measures about three inches in length.

The larva enters the pupa state about the end of July, the moth appearing the following spring.

As a general rule, the larva undergoes the transformation into the pupa state in a superficial cell on or near the surface of the ground, although instances are recorded of its burying itself altogether, as is the case with many other sphinges.

The moth, of which there is but one annual brood, is described by Riley as being of a dull chocolate or greyish-brown colour, the front-wings becoming lighter beyond the middle, and being variegated with dark-brown, as in the figure; the hind-wings are sulphur-yellow, with a broad dark-brown border, breaking into a series of short lines on a flesh-coloured ground near the body. The wings are deeply scalloped, especially the front ones, and the body is furnished with lateral tufts. When at rest, the abdomen is curiously curved up in the air.

This insect is tolerably common, especially in the neighbourhood of Hamilton.

9. *DEILEPHILA CHAMÆNERII*, Harris.

Deilephila Galii, Walker, C. B. M., Lep. Part VIII., page 166.

“ “ Clemens, Syn. N. A. Sph.

“ *Chamænerii*, Morris, Syn. N. A. Lep., Sm. Ins., page 165.

“ “ Harris, Ins. Inj. Veg., page 328.

“ “ Grote, 1865.

The following description of the larva, by Mr. Wm. Saunders, is taken from the April number of the *Canadian Entomologist* for 1877, and was made from three examples found feeding on grape leaves, 5th July:

“Length two and a half inches, tapering towards each end; head small, rather flat in front, slightly bilobed, and of a dull pinkish colour, with a black stripe across the front at the base; basal half of palpi yellow, upper half black; mandibles black, with a patch of yellow between them and the black stripe. Body, above, deep olive green, with a brownish tinge and a polished surface. Second segment with a cervical shield similar in colour to head, its sides dull greenish with two yellow dots. There is a pale yellowish dorsal line terminating at the base of the caudal horn; each segment from 3rd to 12th inclusive has a pale yellow spot on each side of the dorsal line, about half way towards the stigmata thereon; 3rd segment small and almost crescent-shaped; on the 4th, larger and nearly round; 5th still larger, nearly round; 6th, 7th, 8th, 9th, 10th and 11th, about equal in size, nearly oval, and larger than those on 5th. On 12th segment the spot is more elongated, and, extending upwards, terminates at the base of the caudal horn. There is a wide but indistinct blackish band across the anterior part of each segment, in which the yellow spots are set; the sides of the body below the spots are thickly sprinkled with minute raised yellow dots. Caudal horn long, curved backwards, red slightly tipped with black, and with a roughened surface; terminal segment dull pinkish; stigmata oval, yellow, shaded round with dull black. Under surface much paler, colour dull pinkish-green, the pink colour predominating from 5th to terminal segments inclusive, and with a number of very minute raised yellowish dots placed chiefly along the sides. Feet black; prolegs pink, with a patch of black on the outside of each. One specimen spun a light web, binding a portion of the leaf, within which it changed to chrysalis on the 10th of July, and from this the moth appeared on the 28th of the same month. The other two larvæ died before completing their transformation.”

The larva feeds on the grape-vine, and the great willow herb *Epilobium angustifolium*, and on purslane.

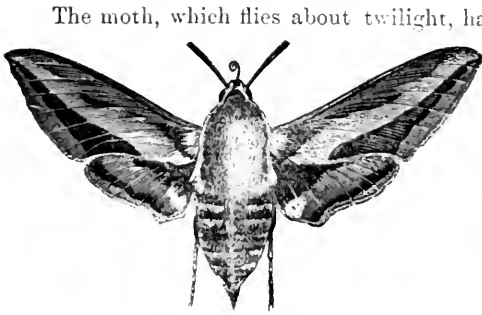


Fig. 23.

The moth expands about two and three-quarter inches.

The moth, which flies about twilight, has the head and thorax olive-brown, with a white line on the sides. The abdomen is greenish-olive inclining to a reddish hue on the sides, and with black and white patches. The fore-wings are deep greenish-olive, with a buff-coloured band extending almost the whole length to the tip; on the outer margin another broad band or stripe of a dull ashy colour. The hind wings small and black, with a rose-coloured broad central band deepening towards the body, and having there a white spot; the hinder margin fringed with white.

10. *DEILEPHILA LINEATA*, Fabricius.

Sphinx lineata, Fabricius.

" *daucus*, Cramer.

" *lineata*, Smith & Abbot, Ins. Ga.

" " Donovan.

Deilephila daucus, Stephens.

" " Walker, C. B. M. Lep., Part VIII., page 171.

" *lineata*, Clemens, Syn. N. A., Sph.

" " Morris, Syn. N. A., Lep. Sm. Ins., page 164.

" " Harris, Ins. Inj. Veg., page 328.

" " Grote, 1865.

Mr. Riley's description is given of this larva, which seems to vary exceedingly :

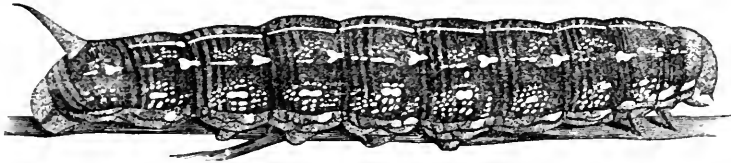


Fig. 24.

"The most common form is given at figure 24. Its colour is yellowish-green, with a prominent subdorsal row of elliptical spots, each spot consisting of two curved black lines, enclosing superiorly a bright crimson space, and inferiorly a pale yellow line—the whole row of spots connected by a pale yellow stripe edged above with black. In some specimens these eye-like spots are disconnected, and the space between the black crescents is of a uniform cream colour. The breathing holes are either surrounded with black or with black edged with yellow. The other form is black, and characterized chiefly by a yellow line along the back, and a series of pale yellow spots, and darker yellow dots as



Fig. 25.

represented in figure 25. Even this dark form is subject to great variation, some specimens entirely lacking the line along the back, and having the spots of different shape."

The body tapers as in *D. Chamenerii*. The larvæ of this genus, when disturbed, fall from their food plants, shorten the anterior segments, and bend the head inwards. Length when full-grown is about three inches; the caudal-horn is rough, and yellowish-orange towards extremity. It is rather a general feeder, being found on the common purslane—*Portulacca oleracea*—turnip, buckwheat, apple, grape and watermelon.

The larval transformation is made in a superficial cell excavated from the surface, where it changes into a light brown chrysalis from which the moth appears in September.

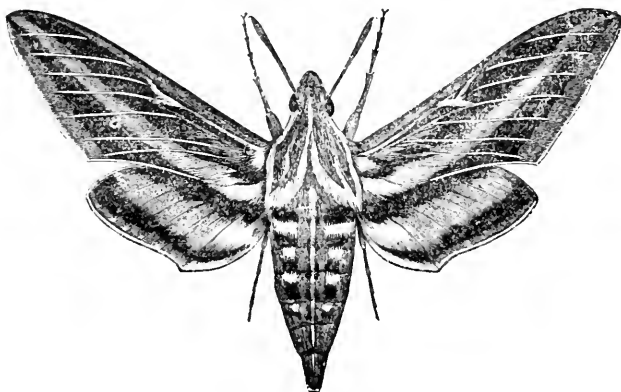


Fig. 26.

This moth (figure 26) is known as the white-lined morning sphinx. It is very common, and has a wide range, being found in all parts of the United States, Mexico and the West Indies, as well as in Canada. Of the two species of *Deilephila*, *lineata* is more common in this Province, and *Chamenerii* in Quebec.

It flies generally at twilight, although it may be occasionally noticed in the early part of the afternoon, in the sunshine, hovering like a humming-bird over the verbenas and phlox.

The moth has the head and thorax dark olive, with a white line on each side. The general ground colour is a rich greenish-olive, tinged with reddish at the sides; on the front part of the body are six longitudinal stripes, while the hinder part is spotted laterally with black and white. The fore-wings deep olive colour, with a straight buff-coloured band extending from the base to the tip; on the outer margin another band of nearly same width, but less distinct colour; the veins are lined with white; the hind-wings black, small, with rose-coloured central band, including a white spot near the inner margin, and a marginal reddish line; fringes white. Expands about three and a half inches. May be readily distinguished from *D. Chamenerii* by its larger size, and by the white veins in the fore-wings.

11. *CHEROCAMPA TERSA*, Linnaeus.

Sphinx tersa, Drury.

" " Fabricius.

" " Cramer.

" " Smith & Abbot, Ins. Ga.

Cherocampo tersa, Walker, C. B. M. Lep., Part VIII., p. 131.

" " Clemens, Syn. N. A. Sph.

" " Morris, Syn. N. A. Sph. Sm. Ins., p. 171.

" " Grote, 1865.

Mature larva.—Light green, with a large subdorsal crimson ocellus on the fourth segment, containing a blue ring and edged with black and white rings, with six others

smaller and similar placed on a white subdorsal line, which begins on the second segment, and extends to the crimson horn. The back is dashed with brown points; breathing places yellow, dotted with black points above and below. (Abbot and Smith.)

The larval transformation takes place in an imperfect cocoon spun on the surface of the ground.

Moth.—Head and thorax brownish-olive, with a lateral whitish line, inclining to roseate at the sides. The body has a broad dorsal dusky band, containing five indistinct darker lines and band of dusky yellow on each side. Fore wings greenish brown, with a small dark brown discal spot and numerous oblique alternate dark brown and yellowish lines, extending from near the base and middle of inner margin to the tip, with a straight brownish sub-marginal line. Hind wings black, with a row of sub-terminal yellow spots. (Clemens.)

Expands 2.70 to 2.80 inches. Length of body 2.55 inches.

12. DARAPSA CHÆRILUS, Cramer.

Sphinx chærilus, Cramer.

“ *azaleæ*, Smith and Abbot, Ins. Ga.

Otus chærilus, Hubner.

Darapsa chærilus, Walker, C. B. M., Part VIII., p. 183.

“ “ Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 168.

Chærocampa chærilus, Harris, Ins. Inj. Veg., p. 328.

Otus chærilus, Grote, 1865.

Mature larva.—Head green, with a narrow, central brownish line. Body green, deepening on the sides and whitish on the dorsal region, with six oblique irregularly oval whitish bands; breathing places orange; caudal horn bluish-green. (Abbot and Smith.)

Undergoes the pupation in an imperfect cocoon on the surface of the ground. Larva feeds on *Azalea nudiflora*, and, according to Dr. Harris, on *Tradescantia virginica*, Spiderwort.

In this species it is said that during the day the larva conceals itself beneath a leaf, stretching out the body on the mid-rib.

Moth.—Head and thorax ferruginous brown. The abdomen fawn colour, with hairs of the hind portions of segments whitish. The fore wings fawn colour, tinged with reddish from base to middle; a broad ferruginous brown shade crossing the nervules, and composed of three lines, having between them two rows of indistinct fawn-coloured spots; a brown line across the middle of the disk. Hind wings ferruginous, deepening to a ferruginous brown narrow border on the excavated portion of the hind margin; fringes whitish.

13. DARAPSA VERSICOLOR, Harris.

Chærocampa versicolor, Walker, C. B. M., Part VIII., p. 131.

Darapsa versicolor, Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 169.

Chærocampa versicolor, Harris, Ins. Inj. Veg., p. 378.

Otus versicolor, Grote, 1865.

We have not seen any description of the larva, though in the *Canadian Entomologist*, Vol. II., 1870, Mr. W. H. Edwards states that it feeds on the Button Bush, *Cephalantus occidentalis*; and Dr. Harris states that it feeds on *Azalea*, Swamp Pink.

Moth.—Pale green, varied with olive and whitish; a white line on each side of the head, a dorsal white line tinged with reddish, and extending from the head to the tip of the abdomen. The abdominal segments tinged with dark buff, with hind margins dark

green and reddish-brown. The fore wings slightly rusty red at the base, with narrow olive-green and dull white bands, the latter tinged with rusty red; an oblique whitish apical line with an olive-green patch adjoining. Hind wings rust coloured, with indistinct greenish terminal margin.

Under-surface of fore wings pale sulphureous, toward the base pale ferruginous; hind wings olive-green, powdered with white at the base.

14. DARAPSA MYRON, Cramer.

Sphinx myron, Cramer.

" *pampinatrix*, Abbot and Smith, Ins. Ga.

Otus myron, Hubner.

Darapsa myron, Walker, C. B. M., Part VIII., p. 183.

" " Clemens, Syn. N. A. Sph.

" " Morris, Syn. N. A. Lep. Sm. Ins., p. 168.

Chærocampa pampinatrix, Harris, Ins. Inj. Veg., p. 327.

This moth has already been so fully described in previous reports, that we shall only briefly refer to it here.

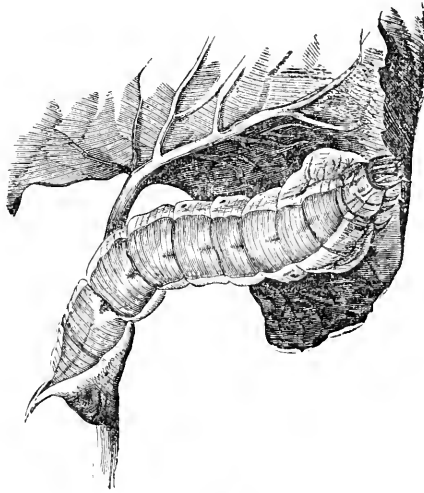


Fig. 27.

The full-grown caterpillar (see fig. 27) is about two inches long, of a pea-green colour, wrinkled transversely, with a pale yellow stripe on each side, and covered with numerous pale yellow dots; the caudal horn sharp and curved backwards. The accompanying figure (27) gives a very good idea of the larva, which has the power of drawing the head and the first two segments of the body within the third segment.



Fig. 28.

The larva is double-brooded, and feeds on the vines and Virginia creeper, *Ampelopsis quinquefolia*. It is much infested by a small ichneumon fly (see fig. 28), which lays its egg in the larva. The larva thus infested always dies. Fig. 29 gives a capital representation of a larva thus attacked.



Fig. 29.

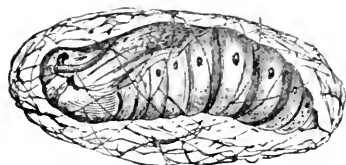


Fig. 30.



Fig. 31.

The larva forms a loose, brown, silken cocoon (figure 30), among the rubbish on the ground.

The moth (fig. 31) expands from two and a half to three inches, is of an olive-grey colour, except the hind wings, which are rust-coloured; and the fore wings and shoulder covers are traversed with olive-green bands. (Harris.)

15. *PHILAMPELUS PANDORUS*, Hubner.

Sphinx satellitia, Linnæus.

“ “ Drury.

“ “ Fabricius.

Daphni pandorus, Hubner.

Philampelus pandorus, Walker, C. B. M., Part VIII., p. 174.

“ *satellitia*, Clemens, Syn. N. A. Ph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 176.

“ “ Harris, Ins. Inj. Veg., p. 325.

“ “ Grote, 1865.

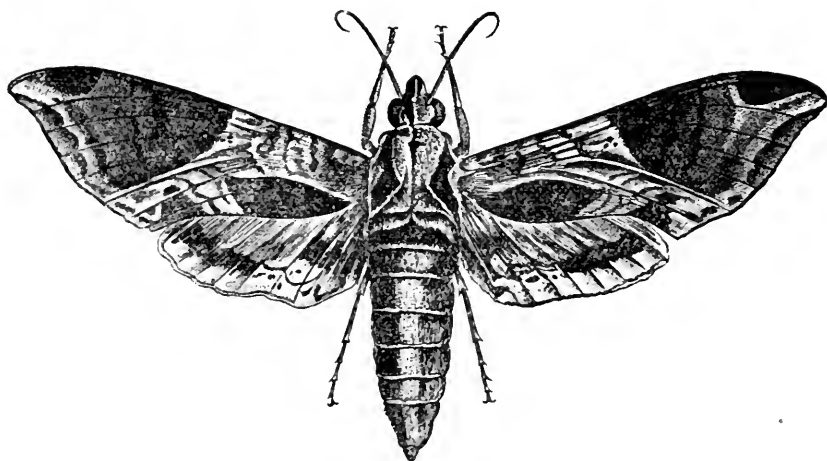


Fig. 32.

The larva (fig. 33) has been well described by Mr. Riley. When first hatched, and for some time afterwards, it is green with pinkish tinge on the sides, and an immensely long straight pink caudal horn. This soon begins to shorten, and finally turns round

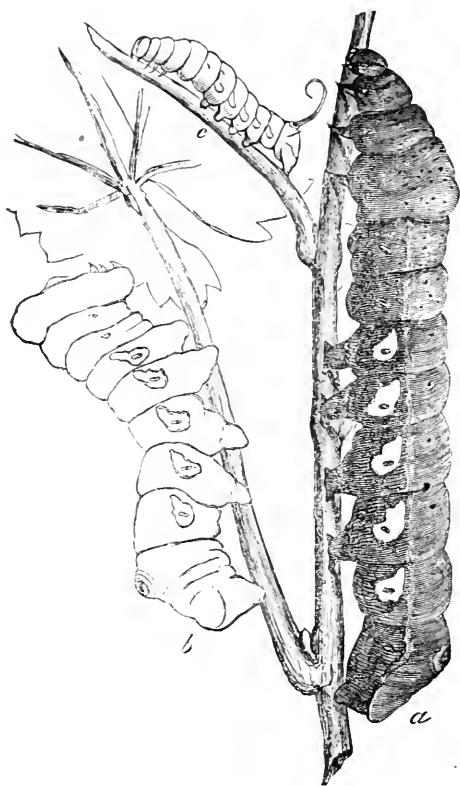


Fig. 33.

like a dog's tail; as the larva grows older it changes to a reddish-brown, and by the third month it entirely loses the caudal horn. It measures when full-grown nearly four inches; it crawls by a series of sudden jerks, and flings its head savagely from side to side when alarmed. The body is pinkish on the back, the sides a darker shade. On the segments six to ten inclusive are five cream-yellow patches, with a black annulation; on segments two to six are numerous small black dots, but on the remaining segments only two; the head reddish-brown. The most common general colour of the full-grown larva is a rich velvety brown—vinous brown.

It feeds on the leaves of the grape vine and Virginia creeper. They consume great quantities of leaves, often stripping bare the branches they attack.

The pupation occurs, according to Mr. Lintner, in a ground cell, constructed at a very moderate depth. The chrysalis is chestnut-brown, about two inches long, with a long thick terminal spine, slightly forked; the moth generally appears the following June. The moth (fig. 32) expands from four to five inches, and is of a light olive colour, variegated with patches of darker olive-green; the antennæ long, slender, and tapering at the extremity into an ample hook, with seta or bristles. This form of the antennæ is characteristic of the genus.

16. *PHILAMPELUS ACHEMON*, Drury.

Sphinx achemon, Drury.

" *crantor*, Cramer.

" " Fabricius.

" " Abbot and Smith.

Pholus " Hubner.

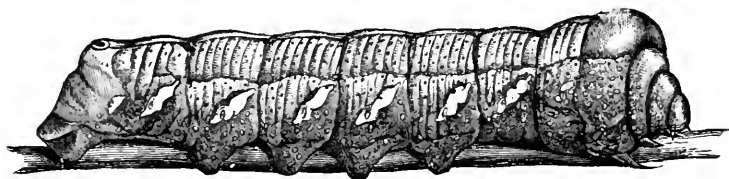
Philampelus achemon, Walker, C. B. M.

" " Clemens, Syn. N. A. Sph.

" " Morris, Syn. N. A. Lep. Sm. Ins., p. 177.

" " Harris, Ins. Inj. Veg., p. 325.

Like its congener, *P. pandorus*, the young larva in its earlier stages is green, and has the caudal horn, which it eventually loses.



a

Fig. 34.

The full-grown larva (fig. 34) is about three inches long, and has the head reddish-brown; body pale reddish-brown on the back, with a darker vascular line, and pale reddish subdorsal line on each side, and the general colour deepened laterally. It has six scalloped cream-coloured patches, bordered with white, containing the breathing places or stigmata. There are from six to eight transverse wrinkles on all but the thoracic and caudal segments. The lenticular caudal tubercle is black, polished, and contained in a brown patch edged with black and white lines. The larva is covered with minute spots, which are dark on the back, but are light and annulated on the sides. The head, which is small, the front segments and breathing holes are somewhat flesh-coloured, while the prolegs and caudal plate are deep brown. Feeds on the vine and Virginia creeper.



Fig. 34.

Before going into chrysalis it often changes to a beautiful pink or crimson colour. It burrows in the ground, and after making a smooth cavity, undergoes its pupa state. The chrysalis (fig. 35) is of a dark shining mahogany-brown colour, roughened, especially on the anterior edge of the segments

in the back. The moth (see fig. 36) expands from three to four inches; it is of a reddish ash colour, variegated with light brown, with two triangular patches of deep ferruginous

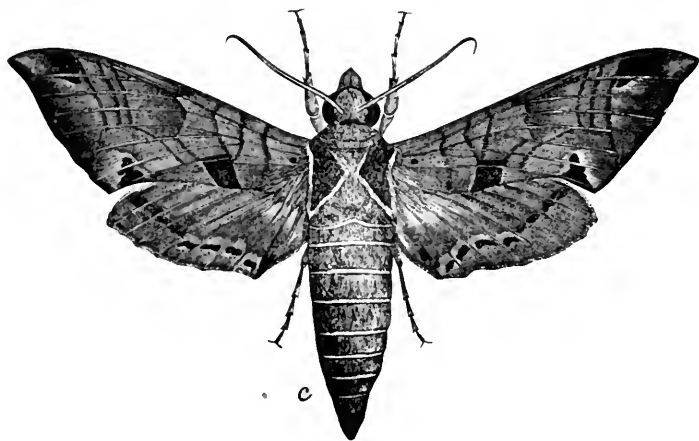


Fig. 36.

nous on the thorax, margined with whitish, and two square ones on each fore wing; the hind wings are pink, with a dark shade across the middle, still darker spots below this shade, and a broad ash-coloured border behind.

It is usually single brooded, the chrysalis remaining in the ground during the fall, winter and spring, and producing the moth about the end of June.

17. PAONIAS MYOPS, Abbot and Smith.

Sphinx myops, Abbot and Smith

Paonias myops, Hubner.

Smerinthus rosacearum, Boisduval.

" *myops*, Walker, C. B. M.

" " Clemens, Syn. N. A. Sph.

" " Morris, Syn. N. A. Lep. Sm. Ins., p. 207.

" " Harris, Ins. Inj. Veg., p. 328.

Mature larva.—"Head bluish-green, with a bright yellow line on the sides. Body bluish-green, with a row of subdorsal and stigmatal reddish-brown spots; six oblique lateral bright yellow bands, with two thoracic subdorsal yellow lines; caudal horn yellow on the sides."

Mr. G. W. Peck, of New York, found that the red blotches on larvæ are not uniform, and are more prevalent on the late brood, though some are entirely green and correspond in colour to similar spots found on the leaves of the wild cherry at that season.

The larva feeds on the leaves of the wild cherry, and undergoes transformation in the earth; the chrysalis is smooth and of a deep brown colour.

Moth.—Head and thorax chocolate-brown, the two latter portions with a purplish or rosy tinge; the sides of the palpi, and a stripe in the middle of the thorax, tawny-yellow; abdomen brownish, with tawny-yellow spots, and the hind portions of the segments dark brown; fore wings angulated and excavated on the hind margin; chocolate-brown colour, with a faint purplish or reddish-grey tinge towards the base; black and chocolate-brown bands and patches; hind wings dull yellow, with the outer half chocolate-brown; short bluish lines above the tips, and a dull yellow spot upon it; the ocellus (or eye-shape spot) black, with a large pale-blue pupil.

This moth is double brooded.

18. PAONIAS EXCÆCATUS, Abbot and Smith.

Sphinx excæcata, Abbot and Smith.

Paonias excæcatus, Hubner.

Smerinthus excæcatus, Walker, C. B. M.

“ “ Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 208.

“ *excæcata*, Harris, Ins. Inj. Veg., p. 327.

Mature larva.—Head apple-green, granulated, flattened, and triangular, with bright yellow side lines; body light-green, studded with pointed white granulations; seven oblique yellowish lines on each side; caudal horn nearly straight, rose-coloured, yellow at sides and sometimes at tip; legs at tips reddish-brown; breathing places reddish-brown. Larva undergoes transformation in the ground. The chrysalis is dark chestnut-brown, tolerably smooth, and with a short triangular rough terminal spine, which is more prominent in the male.

Feeds on the leaves of the apple tree and plum; has also been found on the elm, and is said to feed on the swamp rose, *Rosa Carolina*.

The larva, when irritated, emits a musical chirping sound.

Moth.—Head and thorax fawn colour, with a roseate tinge; body fawn colour, with a dark-brown dorsal line; fore wings denticulated on the hind margin; fawn colour clouded with brown, with black and brownish-red spots and patches; hind legs rose colour in the middle, with a brownish patch at the tip, crossed by two or three short whitish lines; ocellus (or eye spot) black, with pale-blue centre and short whitish lines between the ocellus and the inner margin.

19. SMERINTHUS GEMINATUS, Say.

Smerinthus geminatus, Say. Am. Ent. Lec. Ed.

“ “ Walker, C. B. M.

“ “ Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 210.

Larva in earlier stages uniform pale-green; when full grown measures about two inches in length. Colour pale-green, whitish dorsally; head, triangular, granulated in pale-green in front, and in white at the sides; body tapering slightly in front segments; seven lateral pale-yellow bands, the last much brighter; a whitish stripe down the centre of the back; anal shield granulated, and of the same dark-green colour as the under surface. Caudal horn straight, granulated and violet-coloured. Breathing places elliptical and reddish; legs, reddish; prolegs, green. Feeds on willow.

Dr. Clemens states that he has secured numbers of the pupa from the middle of October to beginning of November at the base of willows.

Moth.—Palpi reddish-brown; head, thorax, in front and tegulæ (shoulder covers) whitish or pale-grey, with a large deep chestnut semi-oval patch on top of the thorax; body brownish-grey; fore wings angulated and excavated on the hind margin; grey colour fringed with rosy and with dark-brown streaks and patches; hind wings rosy, along exterior and terminal border yellowish-grey. The ocellus (or eye spot) is black, emitting a short broad line to inner angle, and with two or three blue pupils; these last give rise to the name *geminatus*, or twin-spotted, and cause the moth to be readily distinguished from the preceding one, *S. excrucatus*.

20. *CRESSONIA JUGLANDIS*, Abbot and Smith.

Sphinx juglandis, Abbot and Smith.

Amorpha dentata juglandis, Hubner.

Smerinthus juglandis, Walker, C. B. M.

“ “ Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 213.

“ “ Harris, Ins. Inj. Veg., p. 328.

Cressonia “ Grote and Robinson. 1865.

Mature larva.—Head large, pointed apex, colour light-green, with white granulations on the sides; body slender, tapering towards the extremities; pale apple-green, granulated regularly on the transverse wrinkles, seven oblique lateral bands, lighter green, approaching white (Lintner), or crimson-edged beneath, with pale-yellow (Clemens), or bright-yellow (Packard). Caudal horn brownish, with dense blackish spinules; feet dark reddish-brown. Length about two and a quarter inches.

Feeds on Black Walnut, *Juglans nigra*, Hickory, *Carya alba*, Iron Wood, *Ostrya Virginica*, and Wild Cherry.

According to Dr. Clemens, the position of the larva when at rest is not sphinx-like; it is extended along the mid-rib of a leaf, and when disturbed throws its head from side to side, making a crepitating noise. It attains its growth about the middle of September, and undergoes its transformation in a cell just beneath the surface.

Pupa is blackish-brown, with the terminal segments of the abdomen flattened; several conical granulated projections or prominences on the front of the head case and on the leg cases.

Moth.—Head and thorax pale fawn colour or greyish, with a dorsal brownish stripe; abdomen fawn colour; front wings, pale grey, with lilac tinge, with broad yellowish-brown shade across them; hind wings ochraceous-brown, or dull fawn colour, with a central light-coloured band edged by dark lines on each side. No eye spots, or ocelli on the wings.

21. *AMORPHA MODESTA*, Harris.

Smerinthus modesta, Harris, Agassiz, Lake Sup.

“ *modestus*, Walker, C. B. M.

“ *modesta*, Clemens, Syn. N. A. Sph.

“ *modesta*, Morris, Syn. N. A. Lep. Sm. Ins., p. 210.

Amorpha modesta, Hubner.

Larva when young is green-coloured, and has a short purple caudal horn, which it loses almost altogether at maturity. It measures when full-grown about three inches, being three-quarters of an inch in diameter. The breathing places small and rust red. Legs brown; prolegs brownish-yellow; yellowish-white oblique lines on the side, which are much more visible in the earlier stages of the larva.

Feeds on the Lombardy poplar.

Pupa two inches long, cylindrical and dark chestnut-brown, terminating in a point or thorn.

Mr. R. Bunker, of Rochester, who has reared this larva from the egg, states that "the habits of the larva are singular; before the first moult it is much inclined to wander, and goes looping along after the manner of the Geometers; after the second moult it becomes sluggish. It is a voracious eater—in short, an accomplished gastronome. Its manner of feeding differs from that of any larva I have had the pleasure of rearing. It rests with its body stretched out at right angles to the edge of the leaf, and eats with its feet fixed on the side of the leaf, and as the food is consumed moves backward, and when the leaf is consumed to the mid-rib, leaves it to try its gormandizing propensities on a fresh one. As the worm, while feeding, rests as above mentioned, the reason of its leaving the leaf half consumed will be obvious—it would otherwise have no surface to hold on to."

Moth is very large, expanding nearly six inches. The palpi, head, thorax, and abdomen, olive-coloured; fore wings denticulated on hind margin; pale olive colour, with an indistinct irregular darker streak across the middle, and margined towards the base of the wing with a still paler hue; a broad, deep olivaceous median band, containing a pale angular discal spot, and darkest at base of wing; two other bands of same colour but different shades across the wings; hind wings purplish-red in the middle, with a transverse black spot above inner angle, and a blackish olivaceous patch beneath it. In the male, the wing is olivaceous exteriorly and along terminal border.

22. CERATOMIA AMYNTOR, Hubner.

Agrius Amyntor, Hubner.

Ceratonia quadricornis, Walker, C. B. M.

" " Clemens, Syn. N. A. Sph.

" " Morris, Syn. N. A. Lep. Sm. Ins., p. 205.

" " Harris, Ins. Inj. Veg., p. 323.

" " *Amyntor*, Grote and Robinson, 1865.

Larva.—When full grown is about three and a half inches long, of a pale green colour, sometimes deep brown, seven oblique greenish-white lines on each side of the body, and a row of little notches like saw teeth on the back; body strong, shagreened or granulated; on the shoulders are four short, obtuse, fleshy notched horns; caudal horn greenish and of medium length, slightly curved; stigmata, or breathing places, black, encircled with yellow and divided by a yellow line; feet reddish; found in May and June; feeds on the American elm (*Ulmus Americana*); undergoes pupation in the ground; pupa dark brown, smooth; tongue-case not apparent.

Moth.—Expands nearly five inches; head grayish; thorax with the top fawn colour or greenish-brown, whitish at the sides; abdomen fawn-coloured or brownish, with a slender black dorsal line and two black stripes at each side; fore-wings fawn colour, varied with blackish-brown, three or four blackish irregular lines across the inner margin to about the middle, a white discal spot with a black discal dash resting on the median nerve (in the males the discal spot is fawn colour); hind-wings pale brownish, with a sub-terminal blackish or dark brown band and shaded with blackish in the middle, or forming indistinct dark-coloured lines.

23. DAREMMA UNDULOSA, Walker.

Sphinx Brontes, Boisduval.

Daremma undulosa, Walker, C. B. M.

Ceratonia repentinus, Clemens, Syn. N. A. Sph.

" " Morris, Syn. N. A. Lep. Sm. Ins., p. 206.

Sphinx " Grote, 1865.

Daremma " Grote and Robinson, 1865.

Larva.—Full grown, about one and a half inches long; head light green, with broad lateral whitish stripes; body pale green, with seven oblique whitish-green bands on the sides, bordered with darker green; caudal horn green, rose-coloured at base tipped with yellow, slightly curved and covered with black spinules; the breathing pores have a white

dot at each extremity and are bordered with orange; legs rose-coloured; prolegs green; feeds on ash (*Fraxinus*) of different species and the lilac (*Syringa vulgaris*); enters the earth and undergoes the pupal state about four inches below the surface; pupa about one and three-quarter inches long, dark brown colour, much granulated or shagreened, with triangular rough terminal spine.

Moth.—Head and thorax dark grey, paler on the side; shoulder covers with central black stripe; abdomen dark grey, paler on the sides, with slender black dorsal line with two black stripes on each side; fore-wings pale, or rather deep ash colour varied with black and white; discal spot white and black margined; black wavy lines across wings with white spaces between; hind-wings blackish-grey, with three parallel narrow, wavy black bands; fringes white, spotted with dark brown.

24. SPHINX QUINQUEMACULATA, Haworth. (See Fig. 37).

Sphinx quinquemaculatus, Haworth.

Phlegethontius Celeus, Hubner.

Sphinx quinquemaculatus, Stephens.

“ “ Wood.

“ *quinquemaculata*, Walker, C. B. M.

Macrosila “ Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 190.

Sphinx quinquemaculatus, Harris, Ins. Inj. Veg., p. 322.

“ *quinquemaculata*, Fitch, 9th Report.

Larva known as THE Tomato or Potato Worm; has been so often described that it must be familiar to most:

It measures about three inches in length, is smooth and wrinkled transversely; head green, small and shining, with a black stripe on each side; the breathing pores black, except the two last, which are yellow; the usual colour bright green marked with white, with seven straight oblique greenish-yellow stripes; body dotted with numerous greenish-yellow spots.

Caudal horn long, slightly curved backward and granulated; variations of colour are very great; common colour is leek-green, from this it varies to lighter green, and to various shades of darker brownish and blackish green; in other instances the green wholly vanishes and the worm is pale or deep amber-brown, blackish-brown, purplish-black or pure black; a voracious feeder and does much damage to the tomatoes and potatoes.

Pupa is a bright glossy chestnut colour, with a long and slender tongue case bent over from the head so as to touch the breast only at the end, and somewhat resembling the handle of a pitcher.

The *Moth* expands about five and a half inches, is of a grey colour, variegated with blackish lines and bands; on each side of the body are five round orange-coloured spots encircled with black. Its tongue when unrolled is nearly six inches long, but when not in use is concealed, like that of all the Sphingidae, between the palpi, coiled like a watch-spring.

25. SPHINX CHERSIS, Hubner.

Lethia chersis, Hubner.

Sphinx cinerea, Walker, C. B. M.

“ “ Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 194.

“ “ Harris, Ins. Inj. Veg., p. 328.

“ *chersis*, Grote and Robinson, 1865.

Larva bright green colour; head bluish, with two pale side bands; seven bright yellow oblique bands on each side, edged above with bluish-green; caudal horn medium length, pale blue colour, sometimes rose, and curved at the tip; anal plate triangular, dotted with black points; legs blackish-blue; prolegs green with black tips; breathing

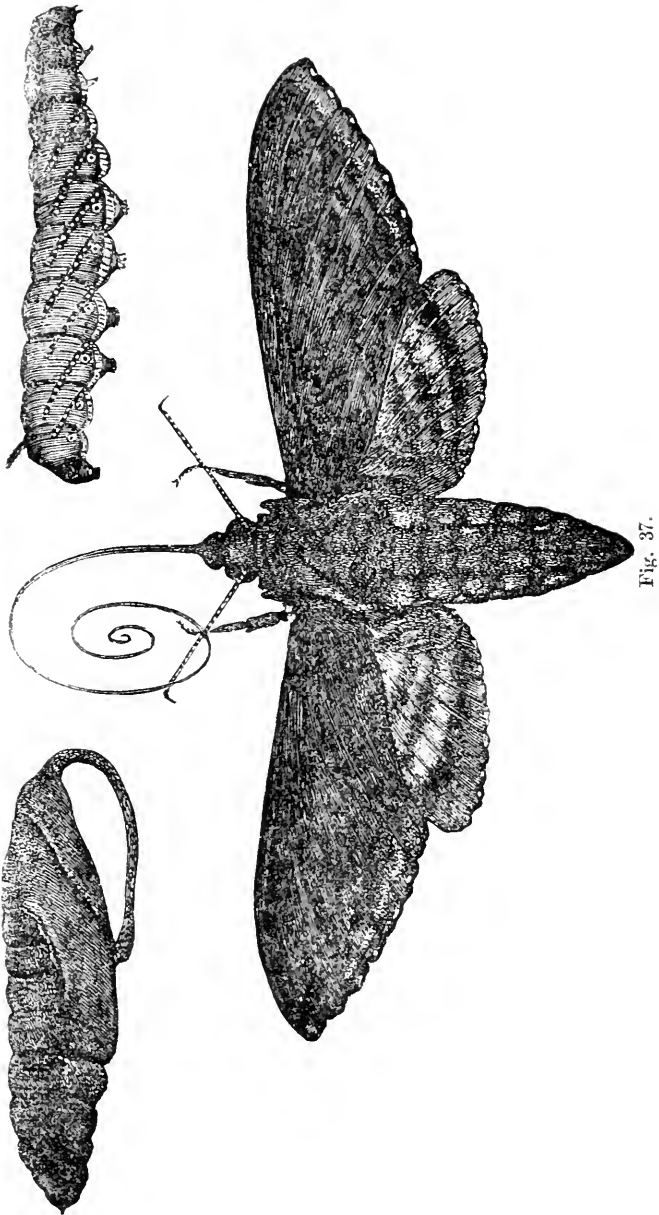


Fig. 37.

pores orange ; length, two and a half inches ; feeds on lilac, *Syringa vulgaris* ; has been also taken on the white ash, *Fraxinus Americanus*, and privet, *Ligustrum vulgare*.

Pupa has tongue case detached and is contained in subterranean cell ; chestnut-brown colour.

Moth.—Head and thorax dark grey ; shoulder cases tipped with whitish with a black line and a spot on each side ; abdomen dark grey, with a black dorsal line and alternate black and white lateral demi-bands ; fore-wings dark grey, with black spot at base, a fine black discal line and blackish lines across the wings ; hind-wings sordid grey, with a broad median and a terminal black band.

26. *SPHINX DRUPIFERARUM*, Abbot and Smith.

Sphinx drupiferarum, Abbot and Smith.

Lethia " Hubner.

Sphinx " Walker, C. B. M.

" " Clemens, Syn. N. A. Sph.

" " Morris, Syn. N. A. Lep. Sm. Ins., p. 197.

" " Harris, Ins. Inj. Veg., p. 328.

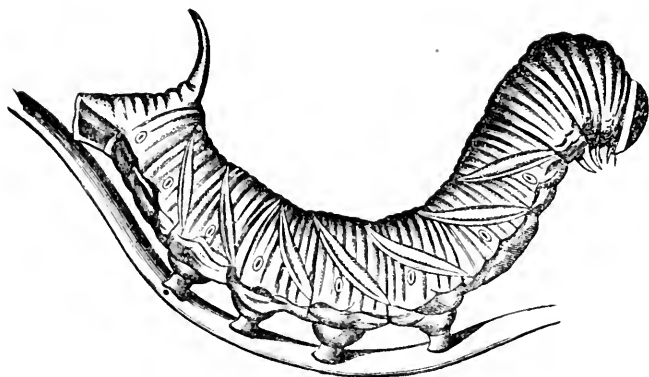


Fig. 38.

Larva (fig. 38) when full-grown measures about three inches, apple-green colour ; head green ; with lateral brown or black stripes ; on the sides are seven broad oblique bands, white, bordered in front with light purple or mauve ; breathing pores distinct and of a bright orange colour ; caudal horn long, dark brown, yellow at base ; body cylindrical and smooth ; feeds on the plum and hackberry (*Celtis occidentalis*.) Appears in July and August. Enters the ground for transformation.

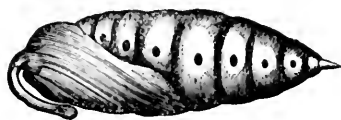


Fig. 39.

Pupa (fig. 39) about one and a half inch long, dark reddish-brown ; has a short thick projecting tongue case.

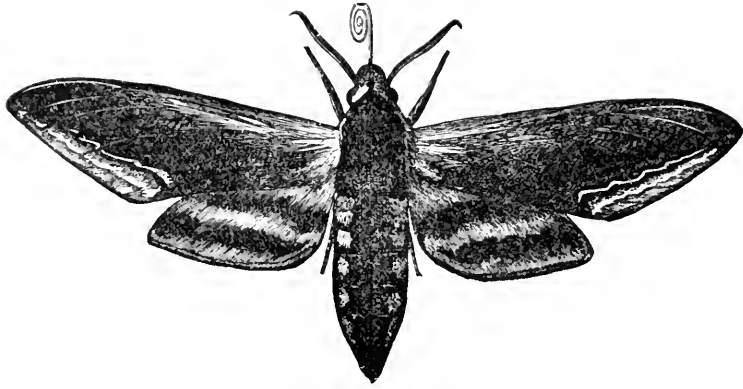


Fig. 40.

Moth (fig. 40) expands about four and a quarter inches; head and throat blackish-brown, whitish-fawn colour at sides; abdomen brown, with a slender dorsal line and a lateral black band on each side containing brownish-white spots; fore-wings dark purplish-brown, with whitish lines on margin; hind-wings whitish, with broad median black band enlarged towards the margin, and sub-terminal black band and fawn-coloured margin.

27. *SPHINX KALMIÆ*, Abbot and Smith.

<i>Sphinx</i>	<i>Kalmiæ</i> ,	Abbot and Smith.
<i>Lethia</i>	"	Hubner.
<i>Sphinx</i>	"	Walker.
"	"	Clemens, Syn. N. A. Sph.
"	"	Morris, Syn. N. A. Lep. Sm. Ins., p. 196.
"	"	Harris, Ins. Inj. Veg., p. 328.

Larva.—Head green, with black stripe at side; body pale green, or yellowish-green; seven oblique pale yellow bands on the sides, edged with blackish-green, and with pale blue above that; breathing pores orange-yellow; caudal horn blue, covered thickly with black tubercles, slightly curved; length about three inches; feeds on lilac or mountain laurel (*Kalmia latifolia*) and ash; undergoes pupation in the ground; pupa dark brown, tongue case exerted with bulbous extremity; goes into pupa about August or September, moth appearing in June or July.

Moth.—Head and thorax rusty brown, paler on the sides; shoulder covers with black lines and patches; abdomen rusty brown with central black line and alternate whitish and black demi-bands; fore-wings rusty brown, paler in the middle, rusty brown streaks, a whitish line near margin; small rusty discal spot, reddish-brown fringes; hind-wings, brownish-white, with broad central and terminal black bands; outer margin and fringes reddish-brown.

28.—*SPHINX GORDIUS*, Cramer.

<i>Sphinx</i>	<i>gordius</i> ,	Cramer.
<i>Lethia</i>	"	Hubner.
<i>Sphinx</i>	<i>pæcila</i> ,	Stephens, Ill. Brit. Ent.
"	"	Wood.
<i>Sphinx</i>	<i>gordius</i> ,	Walker, C. B. M.
"	"	Clemens, Syn. N. A. Sph.
"	"	Morris, Syn. N. A. Lep. Sm. Ins., p. 198.
"	"	Harris, Ins. Inj. Veg., p. 328.

Larva said to be very like that of *S. drupiferarum*; feeds on the apple-tree. Larval transformation is subterranean; pupa with short detached tongue case.

Moth.—Head and top of the thorax blackish-brown, or black and reddish-grey on the sides; abdomen dark grey, with a dorsal black line and alternate black and greyish demi-bands; fore-wings blackish-grey with a roseate hue, white, conspicuous discal spot, blackish streaks and lines; fringes dark brown, spotted with white; hind wings grey, with a black median and a broad black marginal band, the fringes white.

29. SPHINX EREMITUS, Hubner.

Agrilus eremitus, Hubner.

Sphinx sordida, Walker, C. B. M.

“ “ Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 194.

“ *eremitus*, Grote and Robinson, 1865.

Larva three and a half inches long, sepia coloured, slightly granulated like “shagreen,” having a varnished appearance; caudal horn black, rather small. The first segments (*i.e.* to which the prolegs are attached), horn coloured and semi-transparent, having two black shield-shaped blotches upon them, of which the hinder is much larger than the former; prolegs black; seven oblique whitish lateral bands, the hindmost of them broader than the others; breathing pores black; head greenish-brown, with distinct white stripe on each side. (Fyles.) According to Prof. Snow the general colour of body is pale green; this may be only a variation like that of *S. 5 maculata*. Found in September and October, feeding on *Salvia officinalis*, common sage; moth appears in May or June; said to be double brooded.

Moth.—Brownish-cinereous or ash colour; head and thorax paler at sides; broad blackish stripe on shoulder covers; brown dorsal line on top of thorax and black spots; abdomen with dorsal black line and alternate black and whitish demi-bands on the sides; beneath, white with central blackish spots; fore-wings brownish-ash colour, with a black margined white discal spot with short blackish dash through it, blackish streaks across wings; a short blackish-brown line edged on the outside with greyish near the terminal margin; hind-wings yellowish-white, with black spot at base, and a median and broad marginal black band; length of body sixteen lines; expansion of wings thirty-five lines.

30. SPHINX LUSCITOSA, Clemens.

Sphinx luscitosa, Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 197.

Larva and pupa undescribed.

Moth.—Antennæ and palpi blackish-brown; head and thorax blackish-brown or blackish and white at sides; abdomen brown, with a black stripe on each side; fore-wings, pale brown with a rusty hue, the inner border dark smoke colour; a terminal smoky band tapering to the tip of the wing, with a wavy outline in front; a slender black discal line and black lines and streaks across the wings; fringes blackish; hind-wings yellowish, with a broad terminal black band and the fringes whitish.

31. DOLBA HYLEUS, Walker.

Sphinx Hyleus, Drury.

“ “ Cramer.

“ “ Fabricius.

“ *Prini*, Abbot and Smith.

Hyloicus Hyleus, Hubner.

Sphinx Hyleus, Walker, C. B. M.

Dolba Hyleus, Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 203.

Sphinx Hyleus, Harris, Ins. Inj. Veg., page 328.

Mature larva.—Head green, with a pale blue line on each side ; body pea-green, with lateral oblique pink bands edged below with white ; caudal horn crimson ; *pupa* reddish-brown ; tongue case not apparent. (Abbot and Smith.) Feeds on black alder (*Prionos glaber*) and whortleberry.

Moth.—Head and thorax brownish rust-colour, whitish on the sides ; two white spots on top of thorax, two black ones below it ; abdomen brownish rust-colour, with a row of dorsal brown spots and a double row of white spots, and with lateral alternate black and narrow white demi-bands ; fore-wings dull rust-colour or dark brownish, varied with white and blackish-white spot at base, discal spot white and black margined, a band of blackish lines crossing the middle of the wing, margined at the end broadly with whitish, and black circlelets on the hinder ends of the middle veins ; hind-wings whitish, with an indistinct double median blackish band, a broad terminal dark brown band edged above with blackish.

32.—ELLEMA HARRISII, Clemens.

Ancerys coniferarum, Walker, C. B. M.

Ellema Harrisii, Clemens, Syn. N. A. Sph.

“ “ Morris, Syn. N. A. Lep. Sm. Ins., p. 216.

Sphinx coniferarum, Harris, Ins. Inj. Veg., p. 328.

Larva two inches long, the body being smooth and nearly cylindrical, and thickest in the middle ; the head is large, pointed above, flat in front, and green, with a yellow stripe on each side ; body bright green, with a dorsal row of dark-red spots on the fifth to the twelfth segments inclusive, with a bright yellow stripe on each side of the reddish spots, and a lateral white stripe mixed with yellow ; prolegs rose-coloured, and a ventral stripe of same colour ; has no caudal horn. Found in September feeding on the white pine.

Pinus strobus.—Dr. Guthrie says, “I have taken the larva about the middle of September beneath or ascending the trunks of the white pine, from the leaves of which it seems liable when near maturity to be shaken by the high winds.”

Pupa.—Chestnut brown ; tongue case buried ; very difficult to rear in confinement.

Moth.—The palpi, head and thorax pale-umber, with the sides of the thorax at base of fore wings, and the lower portion of shoulder-cases greyish. Abdomen brownish-gray. Fore wings umber-coloured, varied with pale grey ; blackish-brown lines crowning the wings, with blackish moon-shaped spots between the veins ; ends of veins tipped with dark-brown ; fringes brown, spotted with white ; lighter towards the base.

NECROPHORI—BURYING BEETLES.

BY J. FLETCHER, OTTAWA.

The several classes of beneficial insects may be grouped under two heads :—First there are those which do actual good themselves ; and, secondly, those which prevent others from doing harm. It is of the utmost importance that the appearance of all these beneficial insects should be known to those engaged in agricultural pursuits, or many of the most useful of man's auxiliaries, will, without doubt, be frequently destroyed. This is a very easy matter, for the members of the different families, into which insects are classified by entomologists, may nearly always be recognized as such, at a glance, and with very few exceptions the different genera of any family have the same habits.

From the small size of insects, the enormous benefits and injuries which man experiences at their hands, are apt to be underrated or even overlooked altogether. They are, however, becoming more appreciated, day by day, as the labours of specialists are made

known to the world; a remarkable illustration of this may be found in the publication of Mr. Darwin's last work, "Vegetable Mold and Earth Worms." Notwithstanding the vast amount of original investigation, of the utmost importance, on other scientific subjects undertaken by this gentleman, the fruits of which have from time to time appeared in his invaluable works, ever since 1837, when he read a paper on "The Formation of Mold," to the Geological Society of London, he has been accumulating facts and making observations, the results of which are set forth in this fascinating work. Some of the experiments are most remarkable, and the care and patience exhibited by this great worker in carrying them out, are very characteristic of the man: and are so graphically narrated that one who reads the book can almost fancy he has seen them performed. The modifications of the earth's surface by the agency of these small creatures is so great as to be almost incredible, were they vouched for by a less accurate experimentalist than Dr. Darwin. As the result of various careful observations he found that, on one acre of old pasture ground no less than fifteen tons of earth are annually swallowed by worms below the surface, and thrown up above it in the shape of castings.

He points out, too, that the burial of ancient Roman and other remains, scattered over the country, in England, is due to worms, which keep continually throwing up the soil from underneath them, and so let them sink.

Among the insects which do actual good, those which perform the office of scavengers are entitled to more than a passing consideration. These useful insects will be found almost entirely among the Coleoptera or beetles, and the Diptera or flies. As Kirby and Spence's valuable work, "Introduction to Entomology," is not easily attainable in this country, I cannot do better than insert what they have written so well on this subject:—"All substances must be regarded as nuisances and deformities, when considered with relation to the whole, which are deprived of the principle of animation. In this relation stand a dead carcase, a dead tree, or a mass of excrement, which are clearly encumbrances that it is desirable to have removed, and the office of effecting this removal is chiefly assigned to insects, which have justly been called the great scavengers of nature."

"How disgusting to the eye, how offensive to the smell, would be the whole face of nature were the vast quantities of excrement, daily falling to the earth from the various animals which inhabit it, suffered to remain until gradually dissolved by the rain, or decomposed by the elements! That it does not thus offend us, we are indebted to an inconceivable host of insects, which attack it the moment it falls; some immediately begin to devour it, others depositing in it eggs from which are soon hatched larvæ that concur in the same office with ten-fold voracity: and thus every particle of dung, at least of the most offensive kinds, speedily swarms with inhabitants which consume all the liquid and noisome particles, leaving nothing but the undigested remains, that soon dry, and are scattered by the winds, while the grass upon which it rested, no longer smothered by an impenetrable mass, springs up with increased vigour." Many of the Scarabæidæ or Diggers not only live on this filthy material, but dig galleries below the mass into the soil and carry down portions of it, to be food for the young larvæ; the benefit thus conferred is two-fold: not only is the nuisance removed, but a fertilizer is carried down into the soil, and canals are opened by which more may find its way in the same direction, whenever rain falls. The beetles living in dung inhabit it in their perfect as well as larval states; and it is a curious fact, but they are very seldom found to have any of it adhering to them.

"Of the diptera, the larvæ alone derive their nutriment from this source; the imago, which would be suffocated did it attempt to burrow into a material so soft, only lays its eggs in the mass. The members of this order, too, are more select in their choice than the coleoptera—not indeed as to delicacy—but they do not indiscriminately oviposit in all kinds, some preferring horse-dung, others cow-dung, and others that of birds, etc.

"Still more would our olfactory nerves be offended, and our health liable to fatal injuries, if the wisdom and goodness of Providence had not provided for the removal of another nuisance from our globe—the dead carcasses of animals. When these begin to grow putrid, everyone knows what dreadful miasmata exhale from them, and taint the air we breathe. But no sooner does life depart from the body of any creature than myriads of different sorts of insects attack it in various ways. First come the Histers,

and pierce the skin; next follow the flesh-flies some (*Sarcophaga*), so that no time may be lost, having the remarkable characteristic of depositing their young alive: others covering it with millions of eggs, whence in a day or two proceed innumerable devourers. An idea of the despatch made by these gourmands may be gained from the combined considerations of their numbers, voracity, and rapid development. One female of *Sarcophaga carinaria* will give birth to 20,000 young; and the larvæ of many flesh-flies, as *Redi* ascertained, will, in twenty-four hours, devour so much food, and grow so quickly, as to increase their weight two hundred-fold. In five days after being hatched they arrive at their full growth and size, which is a remarkable instance of the care of Providence in fitting them for the part they are destined to act: for if longer time were required for their growth, their food would not be a fit aliment for them, or they would be too long in removing the nuisance it is given in charge to them to dissipate."

As soon as the various tribes of flies have opened the way, and devoured the softer parts, a whole host of beetles actively second their labours. Wasps, hornets and ants claim a share, and before long what was a putrifying mass is only a heap of dry bones, which are soon covered by decaying vegetables and soil thrown up by worms.

Of these scavenger-beetles, none, perhaps, are more interesting than the *Necrophori* or Sexton Beetles, or, as their name denotes, corpse-bearers, in allusion to the singular habit possessed by all the beetles of this genus. They are not content with merely eating their food when they find a supply, but lay eggs in it and then bury it so that no other insects may get it, but that it may be a provision for their future progeny.

These insects may easily be known; they are almost all bright coloured, being of a shining black, ornamented with bright orange markings and fulvous-down underneath, the under side of the elytra is often of a bright yellow colour, which is very conspicuous when they are flying, these organs then being held erect. They fly and run with great rapidity. When flying they are very difficult to distinguish from Humble-Bees, and have very much the same oscillating mode of flying backwards and forwards before any one trying to catch them. The antennæ are very peculiar, consisting of a slender jointed stem, bearing at its end a round nob composed of four flattened joints joined together. There are several species found in Canada, the largest and handsomest of which is *Necrophorus Americanus*, Oliv. I have never been able to observe this species working; but some of the other species may be easily watched if a trap is set for them in the shape of some small animal or bird

Fig. 41.



Represents one of our commonest species (*Necrophorus velutinus*).

The rapidity with which these small creatures will bury a bird many times larger and heavier than themselves, is astonishing. They seem, too, to be gifted with the same instinct as the vulture, for although they are very seldom found hidden like other insects, no sooner is a small dead animal exposed than some of these insects very soon appear, and, after a short survey of the "subject," soon commence operations. If the ground is soft and suitable, they begin at once by making a furrow all round, about the length of their bodies from the animal; the greater part of this work of burying is said to be performed by the male, but I have been unable to verify this. They nearly always work at night, and stop and run under the body whenever a light is brought near them. As soon as the first furrow is completed, another is begun inside this, and the earth is then pushed out into the outside one; the next furrow is beneath the body, and the progress can be marked by the earth that is pushed out all round it from underneath. There is a good deal of running about and inspecting all the time the work is going on, and frequently the workmen will refresh themselves with a meal from the object of their attentions, after which they will take a rest and then will start again, and work away until nothing is visible. They are not even then content, for they will sink small bodies to the depth of a foot from the surface. In this storehouse they deposit their eggs, and then leave them to take care of themselves, and set off in quest of more work to do. If by chance the object they wish to bury is in an unsuitable place, they will accomplish comparatively enormous feats rather than give up the object. Last summer, I noticed one evening a dead swallow lying on a stone pavement close against a building. As I passed I pushed it up against the wall so as to be out of the

way; the next morning as I went by the same place I looked if it were still there; but not seeing it, was passing on again, when, on the opposite side of the path, and half buried behind a tuft of grass, I found it, and in the feathers and underneath the bird were at least half a dozen *Necrophorus velutinus*, four of which I secured. The distance this had, to all appearances, been dragged in one night, was over six feet four inches. Soon after the eggs and their decomposing receptacle are buried, the young larvæ hatch and begin to devour. They soon grow into long, fleshy grubs, narrowed at each end and having the segments distinctly marked, and the upper surface of each one armed with a horny plate, which has strongly toothed edges. These plates serve the larva in the stead of legs, of which it has only three very weak and small pairs. With the assistance of the horny segment-plates, it is enabled to force its way through the soft material in which it lives by alternately lengthening and shortening its body. As these insects during this period never change their locality, legs are useless; but when, after having spun a cocoon, in the earth laid dormant all the winter, and emerged the following spring as perfect insects, they lead an active, roving life, strong and slender legs, suited to their requirements, are provided, showing how nothing useless is created in nature, and how no necessary is found to be wanting.

There are many curious instances on record of the instinct displayed by these insects in providing food for their future young. In Westwood's "Modern Classification of Insects," mention is made of an instance in which some of these insects, in order to get possession of a mole fastened to a stick stuck upright in the ground, undermined the stick so that it soon fell to the earth. From an observation by M. Cadet de Vaux, it appears that while several individuals of some species of *Necrophorus* labour in concert, those of others work alone.

Latreille states that the larvæ of *Necrophorus* entirely consume the buried carcass, leaving neither skin nor bone. Hence it seems that the number of workers is proportioned to the quantity of food necessary for the support of their progeny.

One of the most objectionable features about these handsome and interesting insects is a habit they have of exuding a most fetid fluid, which is derived from the putrid food they feed upon. Unluckily, none of their tribe are free from this objectionable habit, and they never entirely lose the odour.

Among those insects which do good by preventing others from doing harm are found those predacious kinds which live on other insects, and they adopt the most effective means, viz., killing and eating all they find. They belong chiefly to the following families: *Cicindelidæ*, or Tiger-Beetles, are bright metallic-tinted, merciless freebooters, armed with sharp, cruel jaws, and furnished with powerful wings and legs. In the larval state, too, they are very rapacious, living in holes in the ground, and only leaving their heads out; they seize and devour every insect which is unlucky enough to come within their reach.

The *Carabidæ* are a large family of most useful insects, which destroy innumerable destructive larvæ of *Lepidoptera* and other insects. *Calasomas* are particularly active in killing the different species of cut-worms which work such havoc among all spring crops. There are many most valuable and beautiful insects among the *Carabidæ*, the general appearance of which should be known to all, as both in the larval and perfect states they do an incalculable amount of good by keeping down insect enemies.

A very useful family of beetles, because they keep in check the destructive *Aphides*, is known by the name of *Coccinellidæ*, or Lady-birds, and it would be well if the good they do were as well known as they are themselves.

NOXIOUS INSECTS IN ENGLAND AND CANADA.

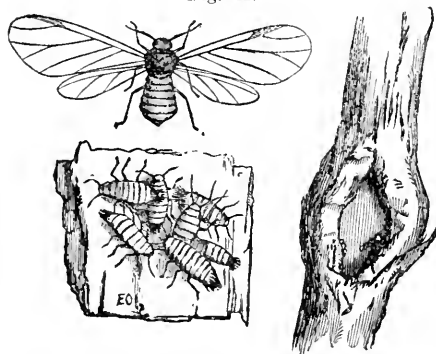
BY THE REV. C. J. S. BETHUNE, PORT HOPE, ONT.

In our last year's Report on Insects, I gave some extracts from Miss E. A. Ormerod's "Notes of Observations of Injurious Insects" in England during the preceding three years, noticing especially those that are familiar to us on this side of the Atlantic. Since the publication of our Report, Miss Ormerod (whose personal acquaintance I had the pleasure of making last summer) has issued her series of "Notes" for 1880, and has published an admirable "Manual of Injurious Insects and Methods of Prevention"—an illustrated volume of nearly 400 pages—that must prove of immense practical value to the farmers and gardeners of Great Britain. I have also recently received from her a copy of a Lecture on Injurious Insects, that she delivered in October last before the professors and students of the Royal Agricultural College at Cirencester. From all these materials supplied by our indefatigable and talented authoress, I propose to give this year an account of some of the most important of the insect enemies that trouble the fruit-growers alike in England and in this country, from which I hope that some useful lessons may be derived for our information and guidance here. Several of the woodcuts with which this paper is illustrated are reproductions of Miss Ormerod's own drawings in her "Manual of Injurious Insects."

1.—THE WOOLLY APHIS OF THE APPLE.

This insect is familiarly known in England by the name of the "American Blight," because it is believed to have been introduced from this continent in the year 1787. Much doubt has been expressed regarding the correctness of this opinion, and for a long time most of our entomologists considered that the European insect was quite a distinct species from the American, and accordingly described the latter under a separate name. The European insect was called *Eriosoma lanigera*, Hausm., and the American, *Eriosoma pyri*, Fitch; now it is agreed on almost all sides that the two insects are identical, though their habits differ very much, and that they should both be known as the Woolly Aphis of the Apple—*Schizoneura lanigera*, Hausm.

In England this creature attacks the branches and twigs of the apple tree, and may be at once "detected by the woolly or cottony growth on the insects, giving the appearance of a white film growing at the bottom of the crevices where a few of them are lurking. Where there are many, the spot appears as if a knot of cotton-wool was sticking to the bough, or even hanging down in pieces several inches in length, ready to be wafted by the first gust of wind, with all the insects in it, to a neighbouring bough."



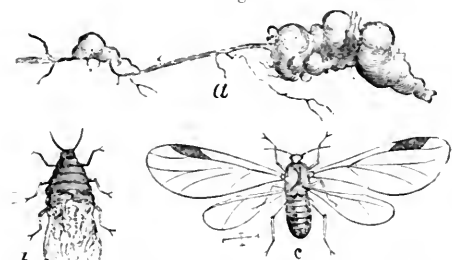
Winged Woolly Aphis, magnified; larvæ much magnified. Apple twig, with the same larvæ nat. size at the lower part of the infested spot.

"The 'Blight' is chiefly to be found in neglected apple orchards. Its headquarters are in crevices in the bark, or in hollows where young bark is pressing forward over the surface where a bough has been cut off, or broken by accident so as to leave a shelter of the old dead bark outside; it may, however, be found on almost every part of the tree into which the Aphis can pierce with its sucker; and the harm caused by the attack is not only from the quantity of sap drawn away from the bark or young shoots, is thus set up. The bark is at first not much affected by the punctures, but the woody layers beneath become soft, pulpy and swollen. The cells and fibres divide and subdivide, and the bark splits open over the swelling, showing the tissue beneath, which is thus exposed for a fresh attack.

"At the end of summer these watery, swollen growths dry up and die, and thus form deep cracks. With the return of spring (as in other cases of injury) a new growth forms round the dead part, and this soft tissue is ready for the young Aphides. Thus, from the swollen diseased growth partly caused by the Aphides, partly by the natural attempts of the tree to repair damage, a constantly increasing diseased mass arises, which shelters the insects in its crevices and finds food for them in its young hypertrophied formations."

In America, on the other hand, this minute insect works under ground, and produces upon the roots swellings and excrescences of all sorts of shapes and sizes. These materially

Fig. 43.



a, The swellings on the root; b, the larva, with the woolly matter attached to its back; c, the perfect winged insect.

interfere with the tree's supply of nourishment, and when very numerous occasion its death, especially if the tree be very young. In Canada we are not aware that this insect has been ever observed, though a similar cotton-covered insect is very common on the branches of the alder, nor does it prevail in the more northerly parts of the Northern States, but further south, especially in Southern Illinois and in Pennsylvania, it has been regarded as one of the worst enemies against which the apple trees have to contend. In 1848 it was found to be so abundant on the roots of nursery trees in Chester County, in the latter State, that thousands of young trees had to be thrown away. In the Eastern States it has frequently been found upon the branches of trees above ground, while working at the same time beneath the soil, and on the continent of Europe it has occasionally been found under ground, producing the same swellings upon the root as in America. It is evident, then, that the habits of the insect are governed by the nature of the climate and the character of the soil.

This insect, to quote Miss Ormerod's Manual, "may be known at a glance from the common Apple Aphis (*Aphis mali*), which is injurious to the leaves, by the white wool with which it is more or less covered, and from which it takes its name of 'Woolly Aphis,' and an examination of the wings through a magnifying-glass will show that they are differently veined. A strong vein runs down the fore wing near the front edge, and from this three veins turn off towards the hinder edge. The third of these veins from the body has only one fork in the American Blight or Woolly Aphis. By this the *Schizoneurina*, to which division it belongs, are distinguished from the *Aphidinae*, which have two forks to this vein (as in the Hop Aphis); from the *Pemphiginae*, which have this third vein without a fork (as in Lettuce Aphis); and from *Chermisinae*, in which this third vein is absent (as in Larch Aphis and Spruce Aphis). This difference in the veins of the fore wings is one clear distinction between the above-mentioned four tribes, of which the great family of *Aphididae* (which includes all the various kinds commonly known as *Aphides*) are composed.

"The Woolly Aphides are without honey-tubes, and underneath the wool are mostly of a yellowish, reddish, or reddish plum-colour. The winged specimens are described as pitchy between the wings, and green, or with the abdomen of a chocolate-brown. The wingless females may be found packed closely together in the cottony masses, with the pale reddish young moving about amongst them. Winged specimens may be found in July and August."

When attacking the roots, the easiest mode of getting rid of this insect is to drench the infested locality with very hot water, which, though hot enough to destroy the life of the insect, is not injurious to the vegetable organization. In the case of young trees that are being transplanted the pest may be got rid of by dipping the roots in strong soap-suds or tobacco water.

When, however, as in England, the insect affects the branches, "its great harbouring points and the nooks from which the broods come forth in spring and infest the trees, are crevices, especially such as are formed of young bark sheltered under old dead masses. It is, therefore, very important to keep up a clean, healthy, well-trimmed state of the branches, such as will not allow of lurking places, or, if they do exist, will allow of these

points of attack being carefully watched. Boughs must be removed in pruning sometimes, and where the Woolly Aphis exists it is certain to try and effect a lodgment under the ring of young bark that grows forward over the stump, but an eye to this matter and a few strong soap-suds brushed on the first bit of wool seen will keep all right. For the same reason the bark should be kept clear of lichens and moss, which form excellent lurking places for the Aphides. In fact, a clean, healthy bark, with a proper allowance of air, light and drainage, is the best of all means of prevention.

"With regard to remedies:—The colonies of insects remain in one place, and soon die if their food is cut off or their breathing pores choked; so that anything which will give such a taint to their harbouring places that they cannot feed, will do good. Soft soap, tar, or in fact anything oily, greasy or sticky that can be well rubbed on, and which by adhering for a time will choke all the Aphides that it touches, will be of use. In the case of an orchard so badly infested that the owner had begun to clear the trees, an application of coal-tar, well rubbed into the infested spots with a hard brush, was tried and succeeded well. The trees were cured of the attack and became healthy. Another observer mentions that his trees on which this was tried were injured and some killed. Probably this different result was from the state of the trees. An application that would be perfectly safe on the blight-tumours of old trees, would be very injurious on young bark that was still living and in an active state."

2.—THE CODLING MOTH—*Carpocapsa pomonella*.

While the English fruit-growers complain of the "American Blight" sent from this side of the Atlantic, we have a much more serious charge against them for sending to us the very destructive "Codling Moth." It is satisfactory to find that this nuisance has not been so injurious during the last few years in Canada as in some previous seasons—though it is always more or less prevalent throughout the country—and that its absence was particularly noteworthy in England during 1880.

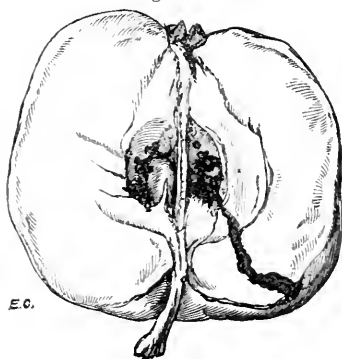
It is not necessary to enter into any detailed account of this insect, as it must be perfectly well known to all our readers, and has been described in our Reports for 1870, 1871 and 1874. I would particularly refer the reader to Mr. Saunders' admirable account of the insect, and the best modes of getting rid of it, in the Report for 1874. As a fresh description, however, is interesting, I shall briefly quote Miss Ormerod's account of the insect:

"The caterpillar of this moth causes what are called 'worm-eaten' apples, which, falling a little before they are ripe, may be known by having a small discoloured spot with a hole in it on the lower side; from this a gnawed passage leads to the middle of the apple, which is commonly nearly filled with dirt.

"The method of attack consists in the moth (when the young apples are beginning to form in the early summer) laying one egg in each fruit, usually in the eye of the apple; from this the caterpillar or maggot hatches, and gnaws its way downwards, taking a direction so as not to hurt the core.

"The caterpillar is about half an inch long, and slightly hairy; whitish, with a brown or black head and dark markings on the next ring, and about eight dots on the others; the food-canal shows as a dark line along the back. As it grows it continues its gallery towards the stem, or the lower side of the apple, where it makes an opening through the rind, and thus is able to throw out the pellets of dirt which could not be got rid of by forcing them upwards through its small entrance-burrow. After this opening is made, it turns back to the middle of the apple, and when nearly full grown pierces the core and feeds only on the pips; and as a result of this injury the apple falls. After this the caterpillar leaves the fruit, crawls up a tree, and, when it has found a convenient

Fig. 44.



Apple injured by caterpillar of
Codling Moth.

crevice in the bark, gnaws a little more of it away so as to form a small chamber, where it spins a white web over itself.

"Here in some cases (according to German observations) it turns to the chrysalis immediately, from which the moth comes out in a few days to begin a new attack on the fruit; or (as recorded in this country) it lives still as a caterpillar for several weeks, and then changes to the chrysalis, in which state it usually passes the winter; and from this the moth comes out in the following June.

"The moth is about three-quarters of an inch in the spread of the fore wings. These have a light grey or ashy brown ground, with delicate streaks, and broader markings of a dark tint, giving a kind of damasked appearance; and at the hinder corner is a large spot of a brownish red or gold-colour, with paler markings on it, and a border of coppery or golden colour around it. The hinder wings are blackish."

The following mode of dealing with this pest is so practical, and has been found so serviceable, that I cannot forbear quoting it for the benefit of those readers who have not the opportunity of referring to the Reports for former years. It is taken from Mr. Saunders' paper on the Codling Moth in the Report for 1874:—

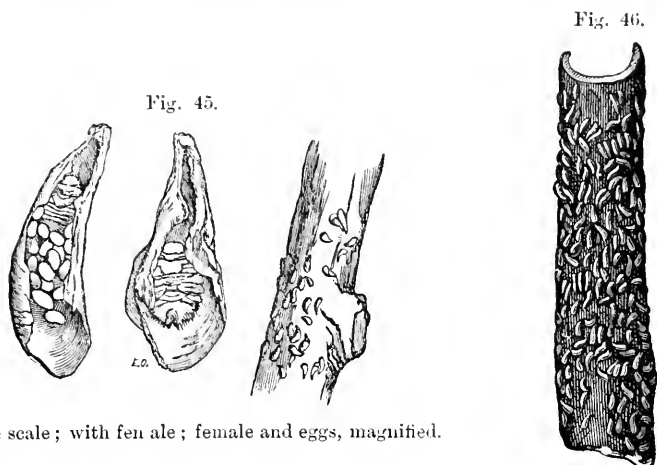
"While all other available means tending to the lessening of the numbers of the Codling Moth worms should be unhesitatingly employed, the chief reliance should be placed on the bandages; use strips of cloth—old carpet or sacking where these can be had—but if these materials are not readily procurable, use paper or cotton. Bandages should be from four to eight inches wide, and either fastened with a string or with a tack at the end, and will be all the better if long enough to go twice around the tree; they should be fastened about half-way up the trunk of the tree some time during the latter part of June, and be examined every ten days from the first of July until the last of August, and at least once after the crop is secured. Care must be taken in unwinding the bandages to prevent the worms from escaping by dropping to the ground, which they readily do when the cocoons are thus torn asunder. A common clothes wringer to pass the bandages through, is one of the readiest and surest methods of destroying the worms, and in this way the bandages can be rapidly handled and re-applied. Be careful and scrape the rough bark off the trees, so that the worms may not find suitable hiding places either in descending or ascending the trunk until they reach the bandage. Attend to these instructions regularly and thoroughly, and try and induce all your neighbours to follow your example, and rest assured that good results will attend united effort."

3.—THE OYSTER-SHELL BARK LOUSE.

This well-known insect is the only other one common to the two countries—except the familiar Apple Aphis (*A. mali*)—which affects the apple to any conspicuous extent. In England it is usually called the "Mussel-Scale;" with us it is familiarly known as the "Oyster-Shell Bark Louse." It has long been termed scientifically *Aspidiotus conchiformis*, Curtis, but is now, in consequence of fuller knowledge of the subject, described under different generic and specific names, as *Mytilaspis pomicorticis*, Riley (see his 5th Report, 1873, pages 91-96).

In our Reports for 1870 and 1871 we gave some account of this insect, but have not referred to it since; some description of it, therefore, familiar though it may be, will probably be of interest. The common names of the insect, both English and American, are derived from the shape of the scales produced by the creature, and which may be found adhering in enormous numbers to the bark of neglected apple trees. "The scales are about an eighth of an inch long, dark brown, slightly curved and rounded at one end, much smaller and of a rusty colour at the other, and wrinkled across. They adhere firmly to the bark, and on lifting full-grown specimens the females will be found inside the smaller end of the scale (sheltered by it, *not* fastened to it), the larger end of the scale being filled with fifty or more white oval-shaped eggs. The young scale-insects that hatch from these eggs are very small, flat, and white, furnished with eyes, horns, six legs, and a sucker. These run about with great activity for a few days, but after a while fix themselves and begin to grow, and gradually change in appearance and turn to pupæ.

The female resembles a fat fleshy maggot, of a greenish colour, globular, somewhat flattened, and with lines across showing a division into rings, but without articulated limbs ; after depositing her eggs she dies, and may be found shrivelled inside the scale."



Apple scale ; with female ; female and eggs, magnified.

Infested twig.

Up to 1873 the male insect had not been discovered, but in June and July of that year Mr. Riley reared a number from scales, and thus describes them : "The wings appear whitish, and under a high magnifying power are seen to be covered with infinitesimally small hooks or bristles. The general colour of the body is pale purplish-brown—not unlike the colour of the shield which protected him,—and like other gentry of his family, he has no proboscis (having lost it when shedding the larval skin), but near the place where it naturally would be are a couple of ocular tubercles, which give him the appearance of having four eyes—two above and two below. The hind wings are replaced by two fusiform balancers, which terminate in a long, delicate hook, and which hold and give strength to the front wings, which are spatulate in form and traversed with but two veins. Frail and delicate as these little beings appear, they are yet possessed of wonderful nerve-force and wing-power ; for the few days of life allotted to them are days of great activity, and in the breeding-jar they keep up an almost constant wing-vibration, and are never at rest except when the temperature is unusually low."

As regards prevention and remedies for this insect, Miss Ormerod mentions, among other plans, that "Scale may be removed at any time of the year, but the best season for destroying it or applying dressings is in spring, so as to clear it away before the young insects—which creep out in May from under the old dead shells—have appeared, to begin the new attack. It may be removed by thoroughly moistening the surface of the infested bark with lathers of any kind of soap (or any dressing that may be preferred), and then scraping the surface with a blunt knife, or rubbing it with pieces of coarse canvas, or well brushing it, so as to clear off the scale without hurting the bark. Scraping with a blunt knife is a good plan, as in this way the scales, moss, and everything on the surface are mixed up in a plaster with the soapy lather and got thoroughly rid of together. If brushing is preferred, good drenchings of soap and water, or of dressings poisonous to the scale, should be given in addition to the first thorough moistening, so as to wash down or kill all that may have only been disturbed or be lodged in crevices. Soft soap or common coarse household soap are useful for this purpose."

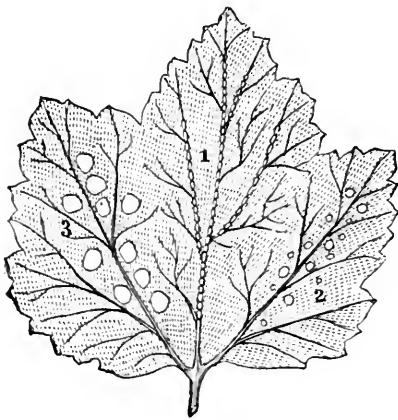
Mr. Riley gives the following advice on the subject :—"The importance of critical examination, before planting, of all young trees and scions, or of applying some simple remedy when the young lice are hatching, cannot be too strongly urged ; and, as a rule which will hold very generally true, it may be stated that the young begin to hatch just about the time the blossom falls and the fruit begins to set. Let those who prefer to work toward eradicating the pest in winter-time (as many no doubt will, on account of

the leafless state of the trees and the greater leisure which most fruit-growers have at that season), vigorously prune and scrape the infested trees, and afterwards apply some of the oily applications usually recommended. As a remedy not previously named, I would mention linseed-oil, which has been used with marked and beneficial results. Many persons have been deterred from using greasy or oily substances on their trees from a fear of evil consequences resulting to the trees; but there is nothing more certain than that judiciously applied in early spring, after the sap begins to flow, these applications do not injure trees, while they are effectual, more especially when applied at such season or during thawing weather, in killing the eggs under the scales, the oily particles being absorbed through and under the scales and destroying the eggs as soon as touched." Crude petroleum I have known to be employed with excellent effect, but of course care must be taken not to apply it to tender shoots or young branches.

4.—THE GOOSEBERRY AND CURRANT SAWFLY—*Nematus ribesii*, Curtis.

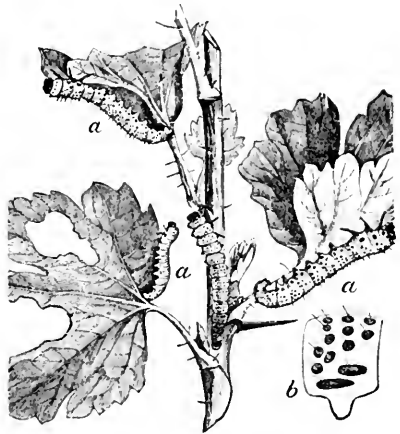
This is another very familiar pest on both sides of the Atlantic, and is only too well known to gardeners, both here in and in England, from the havoc its caterpillars cause every year to the leaves of currant and gooseberry bushes. It has been fully described in our Reports for 1871, 1874 and 1875, by Mr. Saunders.

Fig. 47.



A leaf with eggs on the under side.

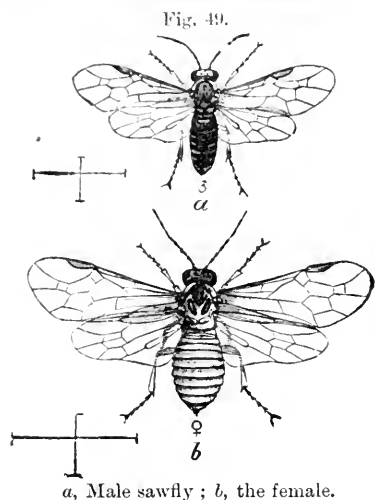
Fig. 48.



Caterpillars of the Sawfly.

The parent sawflies appear, in this country, about the end of April or beginning of May, and lay their eggs on the under side of the leaves of the currant and gooseberry almost immediately after they expand in the spring. The eggs are deposited in rows, usually along the mid-rib and larger ribs or veins of the leaf, as shown in the figure above; the female generally selects for the purpose leaves that are low down in the middle of the bush. The larvæ hatch out in about a week, and begin at once to feed by eating small round holes in the softer parts of the leaf; as many as sixty or seventy have sometimes been found on a single leaf. The attack of the caterpillars may be discovered at once by the appearance of a number of small holes eaten through the leaves. Each brood feeds on the leaf on which it was hatched until it is completely stripped of all that is eatable, and nothing but the hard ribs remain; the individuals then scatter over the bush, half a dozen or more being found on a single leaf, and in a bad attack soon completely denude the bush of its foliage.

"These grubs," to quote Miss Ormerod, "are of a bluish-green, with black head, feet, tail, and also black spots on each segment, and with a yellowish space just behind



of the length marked by the straight lines; the head and body between the wings are ochre-colour or yellow, variously marked with black; abdomen yellow or orange; legs yellow, with brown or black tips to the feet and hinder shanks; horns brown or black. The four wings are transparent and iridescent.

"An excellent and effectual method of preventing attack in the coming season is to remove the soil from beneath the bushes to the depth of a few inches early in spring, and give a good sprinkling of lime; by this means the caterpillars which winter in the ground are completely cleared away. A slightly different method, but thoroughly successful, is to remove the surface soil below the bushes in winter, dig a deep hole, and bury the whole of the removed soil, cocoons and all (so deeply as to ensure having no further mischief from them), and replace the earth removed with manure and the soil dug from the hole.

"This complete removal of the soil with the cocoons is quite worth while wherever the gooseberry caterpillar is prevalent, and a layer of unslacked lime, well mixed with the soil as deep as the cocoons are, would be highly beneficial in case of the surface-soil not being removed. Gas-lime also would be of service, well sprinkled on the surface, if fresh, or lightly pricked into the surface-soil beneath the bushes after it had been aired for a few weeks, taking care not to lay it against the stem.

"When the caterpillars appear on the bushes, it is of great importance to attend to them at once; whilst still very young two or three dozen may be found on one leaf and got rid of together, which in a few days would have spread themselves over the bush. This early stage of attack may be known by the leaves appearing as if riddled with dust-shot. At a later stage thorough hand-picking, or shaking the bushes so as to make the caterpillar fall, is of service. If the caterpillars are allowed to drop on the ground, they should be crushed with the foot, or with the back of the spade; but a surer plan, with little more trouble, is to spread cloths or put some tarred boards under the trees, and thus collect and kill them."

The plan of removing the surface-soil from beneath the bushes, which is new to us, has been adopted with great success during the last twenty years (Miss Ormerod records in her Report for 1880) at Oxenford Castle. The soil is annually removed in winter, a deep hole is dug in some part of the garden, and in this the removed soil, with whatever may be in it, is buried. The soil under the bushes is replaced by that out of the hole, with the addition of some manure. It is important that the hole should be *deep*, as if there was only a light covering many of the larvæ and pupæ would not be the worse for being moved, and would emerge in the spring to inflict as much damage as usual.

In this country we have no doubt that our small-fruit-growers will adhere to the use of powdered white hellebore, which has proved so effective in the past, is so easy to apply, and from the use of which no evil consequences have ever resulted to our knowledge.

the head and another just before the tail. When full grown, and after changing the skin for the last time, these yellow patches still remain, but they are otherwise of a delicate pale green, with sometimes two little black dots on the head, and are about three-quarters of an inch in length. After the operation of casting the skin they rest awhile, and then crawl down the stem of the bush or drop from a bough, and at once begin to bury themselves. When deep enough, which may be from two to eight inches, according to the nature of the soil, they form a cocoon of a gummy secretion, in which they turn to chrysalids. This takes place in about three weeks during summer; in the case of the late broods the grub remains unchanged in the cocoon during winter, and does not turn to the chrysalis till spring, in time for the gooseberry sawfly to make its appearance as the gooseberry and currant bushes are coming into leaf.

"The sawfly is of the shape figured above, and

5.—THE PEAR-TREE SLUG-WORM.—*Selandria cerasi*, Curtis.

In 1874, as Mr. Saunders relates in his very complete account of this insect in our Report for that year, the slug-worms were unusually abundant on pear-trees in the neighbourhood of London, Ontario, in many cases destroying the foliage so thoroughly, that "they looked as if they had been scorched by a fire, every leaf in some instances dropping from the trees, so that for a time they were as bare as in mid-winter." Such a visitation, happily, is not common; still these disgusting creatures are usually to be found more or less every year on our pear and cherry trees. In Scotland, in 1880, they appear to have been numerous and destructive both at Dalkeith and Dumfries.

Fig. 50.



A leaf attacked by slug-worms.
a, Magnified specimen.

The slug-worms feed on the upper surface of the leaves of the pear and cherry, eating away the whole of the soft substance of the leaf, so that the veins and the skin of the lower side are all that remain. They may be recognized, when at their work of destruction, by their blackish or bottle-green colour, together with their peculiar shape, and the covering of slime or moisture exuding from their skin, which gives the worms the appearance of a slug, or rather that of a lump of wet black dirt fallen on the leaf and run together at one end. They may be at once recognized also, when very numerous, by their disgusting and sickening smell.

Miss Ormerod relates that, in England, "the sawflies appear in July, and deposit their eggs on or in the upper side of the leaf; these eggs are oval, and hatch in a few days. The larvæ are of the lumpy shape figured above, much the largest at the back of the head; they are furnished with ten pairs of feet—that is, one pair on each of the three segments next to the head, and a pair of sucker-feet on each of the other segments, excepting on the fourth from the head and the tail segment, which are footless. When feeding, they keep the end of the tail a little turned up. In four or five weeks these slug-worms arrive at their full growth, which is about half an inch in length, cast their dark bottle-green skins, and appear as yellow or buff caterpillars, free from all shine, and transversely wrinkled, instead of being perfectly smooth. In the instance noted this happened at the beginning of October, and the caterpillars shortly after left the leaves and went down into the ground, where they spun an oval brown silken cocoon covered outside with earth, from which the sawflies came up in July in the following year. The female fly is of a shining black, tinged with violet; the wings often stained with black, with dark nerves, and a dark brown mark (the stigma) along the fore edge. The four anterior legs are brownish ochre, and the others are more or less of that colour, but generally much darker; and the thighs, or at least the base, are pitch colour."

In Canada these saw flies are double-brooded. The winged flies appear in May; the eggs are deposited singly in little slits cut for them in the skin of the leaf by the ovipositor of the female, and these produce a brood, coming out in the perfect state in July; from which a second brood arises, which is full grown in September or October. These remain in the ground during the winter, and for the most part appear (as above mentioned) fully developed in the following May; but some remain in the ground unchanged till the following year.

As a prevention, Miss Ormerod recommends the same plan as in the case of the gooseberry saw fly, viz., to skim off the surface soil beneath the infested trees, and get rid of it so as to destroy the contents. The cocoons are stated to be at a depth of from one to three or four inches below the surface, according to the nature of the soil. She suggests as remedies, (1) Shaking the flies down from the trees early in the morning or late in the evening (or at whatever time it was found they were collected on the leafage), and catching them on boards covered with wet tar, or cloths, taking care that they were destroyed before they could escape; (2) Dusting with caustic lime two or three times; (3) Syringing with tobacco water, strong soapsuds, etc.; and (4) Showering the trees with a solution of hellebore.

A most effective plan for getting rid of the pest is thus described by W. Saunders (Report for 1874):

"On the 29th of July, when going through the orchards in the afternoon, the new brood of flies were found in the greatest abundance, resting on the young leaves, or on those portions of green which still remained on the leaves partially eaten by the last brood; they were congregated, however, more especially on those trees where green leaves were most abundant. On disturbing them they would fall to the ground with the antennæ bent under their bodies, and the head bent forward. On half a dozen trees we caught about 60 specimens, and might have taken hundreds, they were so thickly spread that in many instances there were two and three on a single leaf. By the last week in August, the second brood of slugs were hatched; some very tiny creatures, others by this time half grown. Now, those trees which had previously escaped were all more or less covered, and would no doubt soon have been stripped, had not some measures been at once taken to destroy them. A raised platform was rigged up in a one horse cart in which was placed a barrel of water in which a pound of powdered hellebore had been mixed, and from the elevated stand this mixture was showered lightly on the trees from the rose of a watering-pot. It was astonishing how quickly the trees were cleaned, scarcely one could be found on a tree the morning after the application had been made, and ten pounds of hellebore with five or six days work of man and horse served to go over the whole ground, the work being completed in much less time than we had supposed it could."

With the exception of some species of Aphis, or Plant Lice, which affect many kinds of trees, the foregoing are the only species of insects attacking fruit trees that appear to be common to this country and England. There are, however, some species very similar to well-known pests here that cause trouble and anxiety to the old country gardener. Among these we may mention

6. THE LACKEY MOTH—*Clisiocampa neustria*, Curtis,

which is very closely allied in appearance and habits to our familiar "Tent Caterpillars" (*Clisiocampa Americana* and *Sylvatica*), as may be learnt from the following description, which would almost answer for our own species:—

"The caterpillars of the Lackey Moth are injurious to oak, elm, birch, etc, but are especially pests when they attack the apple. The eggs are to be found in winter and spring, laid on naked twigs, in compact spirally-arranged rings about half an inch long. From these eggs small black hairy caterpillars hatch about the beginning of May, and immediately spin a web over themselves, which they enlarge from time to time as needed for their accommodation. In these webs they live in companies of from fifty to two hundred, and from them the caterpillars go out to feed on the leaves, returning for shelter in wet weather or at night. When alarmed, they all let themselves down by threads, either to the ground, or else, after hanging in the air till the alarm is past, they go up again by their threads to the tree.

"When full fed, which is about midsummer, they are an inch and a-half in length, and hairy; of a bluish-grey colour, marked with two black eye-like spots on the head, two black spots with a scarlet space between them on the next ring, and three scarlet stripes on each side and a white one on the back, all bordered with black along the rest of the caterpillar. At this stage the caterpillars no longer live in companies, but each finds some sheltered spot, between leaves, in hedges, beneath the bars of railings, under roofs of sheds, or even on the tops of walls, where it spins a sulphur-coloured silken cocoon, mixed with sulphur-coloured powder and with hairs from the skin woven into it, from which the moths hatch in July.

"The moths are variable in colouring, mostly with rusty-fox or ochrey markings, but some have the fore wings of a red-brown, with two pale ochreous streaks; others yellowish, with dark brown bars; and others are variously tinted: the hinder wings are reddish-brown. It is stated that the moths, and especially the females, seldom fly, but remain concealed by day under leaves and in long grass, and come out at night.

"The caterpillars seldom do the enormous quantity of mischief with us in England

that they are noted as causing in France, where, according to the old law, it was compulsory on proprietors to have the webs on the shoots cut off with shears and destroyed, in consequence of the ravages of the caterpillars (if left unchecked), ruining the apple leafage over an extent of miles of country."

7. THE MAGPIE MOTH OF THE GOOSEBERRY—*Abraxas grossulariata*, Stephens,

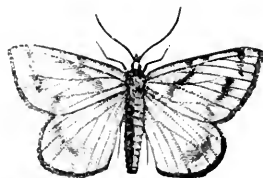
is another English insect that may be mentioned on account of its resemblance in its caterpillar state to our Geometer Currant and Gooseberry worm (*Abraxas ribearia*, Fitch), represented in the annexed wood-cut, which will almost serve for its English relative, though the moths are totally different in their markings.

Fig. 51.



1 and 2, Caterpillars ; 3, chrysalis of *Abraxas ribearia*.

Fig 52.



Moth of *Abraxas ribearia*.

The English insect—the Magpie Moth—is thus described :—“The caterpillars of this Moth are not so injurious as those of the Gooseberry Sawfly, but they occasionally occur in sufficient numbers to strip the bushes of their leaves. They frequent the Gooseberry and the Black and Red Currant, and also the Common Sloe, or Blackthorn. The egg—one or more—is laid on the leaves towards the end of summer ; the caterpillars hatch in September, and feed for a short time ; and then either fall to the ground with the fall of the leaves in autumn, and remain sheltered amongst them for the winter, or they spin the edges of a leaf together, which they have previously fastened by threads to the bough, and inside this protection remain until the return of spring. When the new leafage unfolds, the caterpillars come out and feed till May or the beginning of June, when they change to chrysalids. The caterpillar is one of the kind known as “loopers,” from the peculiar looped shape it draws itself up into when alarmed (see fig.) ; the head is black ; body cream-coloured, with a reddish orange stripe along the sides ; the whole of the second ring, and the under side of the third and fourth, and of the four nearest the tail, are also reddish-orange. A row of large irregular black spots runs along the middle of the back. When full fed it spins a light transparent cocoon attached to twigs, or palings, or in crevices of walls ; and in this it changes to a chrysalis, yellow at first, but afterwards shining black, with orange-coloured rings.

“The Moth is very variable in appearance ; commonly it has a black head, yellow body between the wings, with a large black spot in the middle ; the abdomen also yellow,

with five rows of black spots. The wings are white, spotted with black, and the forewings have a yellow blotch at the base and a yellow band across them. There are, however, almost endless varieties of markings, from black of different shades, to white; some have the upper half of the wing white and the lower black, or the reverse; some have the ground colour of the wing (instead of merely a band) yellow; and in some cases the hinder wings are striped with black. The Moths appear about midsummer or rather later."

8. THE WINTER MOTH—*Cheimatobia brumata*, Stephens.

This insect resembles very much our species of canker worms (*Anisopteryx vernata* and *Pometaria*), which have been described by Mr. Saunders in the Report for 1875:

"The caterpillars of this moth are injurious to almost all fruit and forest trees. They feed on the young buds and leaves of the plum, apple, pear, elm, lime, willow, hawthorn, and many others, and occur at times in such great numbers as to cause a very serious amount of damage. The moths (known as "Winter Moths," from the season of their appearance), come out about the end of October. During November and December the females, which have only abortive wings, creep up the trees and lay their eggs on the leaf or flower buds, on the twigs, or in crevices of the bark.

"The eggs are greenish at first, and gradually change to brown or red. They are very minute, and very numerous (a single moth laying as many as two hundred), and they hatch about the beginning of April. The newly-hatched caterpillars are only about as thick as a horse-hair, greyish in colour, and may be seen swinging in the air at the end of their threads; when full-grown they are half an inch long, of a yellowish-green, with pale green head, black or blue line down the middle of the back, and whitish lines on each side. When walking they form a kind of upright loop, whence the name "Looper caterpillars." They feed first on the young unopened buds, and, as the leaves expand, they draw two or three together with their webs, and shelter themselves within when not feeding. When full-fed, towards the end of May (by which time they have often caused great damage), they let themselves down by a thread to the ground, bury themselves, and turn to chrysalids about two or three inches below the surface, from which the moths come up towards the end of October.

"The male moths have the fore wings of an ash-grey, with various transverse markings, and the hind wings of a greyish-white. The females have a most extraordinary appearance, from the great size of the abdomen and the small size of the abortive wings; they have no powers of flight, but fall down as if dead when alarmed, or run with some speed to hide themselves. In November the males may be seen, after sunset, flying from tree to tree, and the females creeping up the stems to deposit their eggs."

The same method of prevention is recommended in England as in this country, viz.: to encircle the trunk of the tree with some obstacle which the female cannot pass, and so prevent it from depositing its eggs upon the foliage.

9. THE GREEN ROSE CHAFER—*Cetonia Aurata*, Curtis.

This is the only other English insect injurious to fruit that remains to be mentioned, as it resembles in its habits our common May-beetle, or "June-bug" (*Lachnosterna fusca*), which often grievously injures the roots of strawberry-plants in its larval state, when it is familiarly known as the "White Grub." Both belong to the Scarabaeidae, or Digger family of beetles, described by Mr. Fletcher in the Report for 1879.

Miss Omerod thus describes the English insect:

"This chafer is injurious both in the larval and perfect state. In the first—that is, as a grub—it feeds on the roots of strawberries, grass, and other plants; as a beetle it frequents many kind of flowers, including the rose, from which it takes one of its names; but is more especially injurious by its attacks on strawberry-blossoms, and to the flowers of turnips left for seed, where it eats off the anthers from the stamens and thus renders the flowers abortive."

"The eggs are laid in the ground, where the maggots hatch and feed for two or three years. When full-grown they are upwards of an inch and a half in length, thick and

fleshy, of a whitish colour, with an ochreous head armed with strong jaws; the pairs of short feet are of a rusty ochreous colour, and the hinder portion of the grub or maggot is enlarged, curved towards the head, and of a lead colour. These grubs are much like those of the cockchafer, but are distinguished by having a horny rusty spot on each side of the segment behind the head, and by the body being clothed with transverse rows of rusty-coloured hairs; whereas the grub of the cockchafer is almost hairless, and is without the rusty spots.

"When full-fed they make earth-cases 'as large as a walnut,' at a considerable depth beneath the surface, which are smooth inside, but covered outside with pellets of soil which have passed through their own bodies; and in these cocoons they turn to ochre-coloured pupæ.

"The Chalcids, which sometimes appear as early as the beginning of May, are of a rich metallic golden-green above, with white or ochreous spots or streaks looking like cracks running across the bright green of the wing-cases; beneath they are coppery, with a rose-coloured tint. The horns are much like those of the cockchafer, excepting that the club is formed of only three leaves. Beneath the wing-cases are large brown membranous wings, by means of which, when they have finished whatever is eatable in one place, they can fly with ease to another; it may be a strawberry-bed, or may be field of turnips in blossom; and thus, if the weather is fine, they continue to attack whatever may attract them throughout the summer; in wet weather they die earlier in the season."

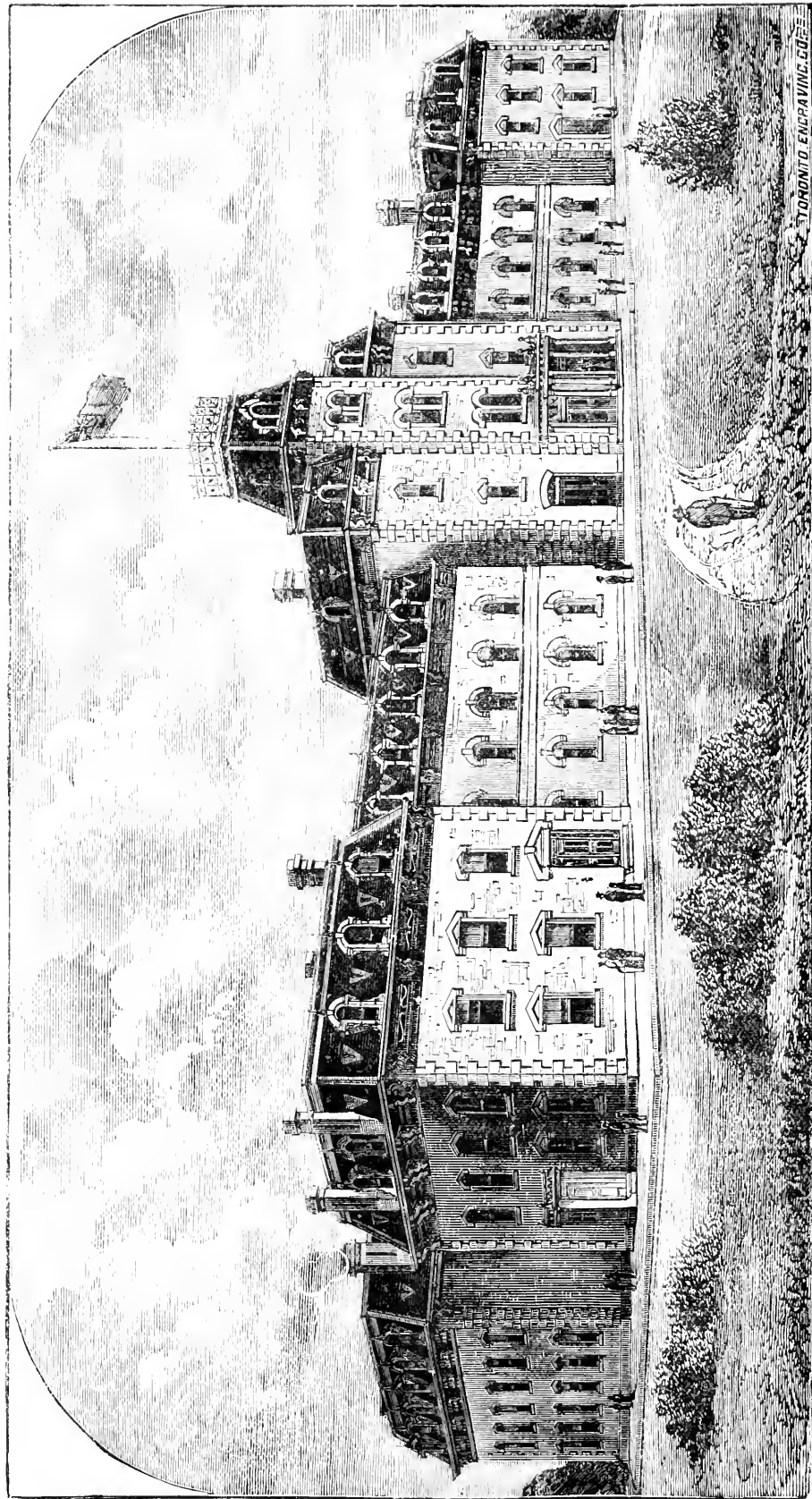
APPENDIX TO REPORT

OF THE

Commissioner of Agriculture and Arts.

APPENDIX (E).

REPORT OF THE ONTARIO AGRICULTURAL COLLEGE, GUELPH, FOR
THE YEAR COMMENCING 1st JANUARY AND ENDING
31st DECEMBER, 1881.



ONTARIO AGRICULTURAL COLLEGE, GUELPH.

REPORT OF THE PRESIDENT
OF THE
ONTARIO AGRICULTURAL COLLEGE,
GUELPH,
FOR THE
YEAR COMMENCING 1st JANUARY AND ENDING 31st DECEMBER,
1881.

ONTARIO AGRICULTURAL COLLEGE,
GUELPH, 31st December, 1881.

To the Honourable S. C. Wood,

Commissioner of Agriculture for the Province of Ontario.

SIR,—I have the honour to submit for your consideration the following report of work done in the Ontario Agricultural College during the year 1881, being the Seventh Annual Report of the institution.

As the Act of Incorporation passed by the Legislative Assembly of the Province of Ontario, on the 11th February, 1880, defines somewhat minutely the work of the College and the Farm, it is here quoted for the information of all who may wish to know the objects for which the institution is maintained :—

No. 60.]

BILL.

[1880.

AN ACT RESPECTING THE AGRICULTURAL COLLEGE.

HER MAJESTY, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows :—

1. The School of Agriculture, heretofore established in the county of Wellington, in this Province, for instruction in the theory and practice of agriculture, horticulture and arboriculture, and the conducting of experiments relating thereto, is hereby continued, at its present site, under the name of the "Ontario Agricultural College and Experimental Farm." School of Agriculture continued.
Site.
Name.

Nature of instruction.

2. The said college shall be furnished with all appliances, such as land, buildings, implements, tools and apparatus generally, as may be necessary for theoretical and practical education in agriculture, horticulture and arboriculture, and the course of instruction therein shall be with reference to the following subjects :—

- (1) The theory and practice of agriculture ;
- (2) The theory and practice of horticulture ;
- (3) The theory and practice of arboriculture ;
- (4) The elements of the various sciences, especially chemistry, (theoretical and practical), applicable to agriculture and horticulture ;

(5) The technical English and mathematical branches requisite for an intelligent and successful performance of the business of agriculture and horticulture ;

(6) The anatomy, physiology, and pathology, of the ordinary farm animals ; with the characteristics of the different varieties of each kind ; with the management thereof in the breeding, raising, fattening and marketing of each, and with a knowledge of the cheese and butter factory systems ;

(7) The principles of construction and skilful use of the different varieties of buildings, fences, drainage systems, and other permanent improvements, machinery, implements, tools and appliances necessary in agricultural and horticultural pursuits ;

(8) And such other subjects as will promote a knowledge of the theory and practice of agriculture, horticulture and arboriculture.

Practical education insisted upon.

3. The education and instruction shall be at once theoretical and practical, the former known as a course of study, and the latter as a course of apprenticeship ; and a time, not less than three and not more than five hours daily, on a yearly average, shall be spent in undergoing the latter, and for the encouragement of such labours, an allowance in part liquidation of expenses may be made ; yet, notwithstanding, the course of apprenticeship may be dispensed with, if a satisfactory examination be previously passed in all the operations therein required.

Nature of experiments.

4. Experiments with the different varieties of cereals, grasses and roots, of trees, plants, shrubs, flowers and fruits ; with different modes of cultivation ; with different manures ; with the breeding, raising and fattening of animals ; with the products of the dairy ; and with whatsoever else may be of practical benefit in adding to the knowledge of the facts, principles and laws of the science and art of agriculture, horticulture and arboriculture under the climatic conditions of this Province, shall be carried out on the experimental farm ; and the modes of procedure and results published from

Publication of procedure and results.

time to time.

Rules, regulations and curriculum of the college.

5. The government of the college shall be under and according to such rules and regulations as the Lieutenant-Governor in Council may from time to time prescribe ; and such rules and regulations shall contain provisions for the standard and mode of admission, the course of study, and apprenticeship in each branch in which instruction is given, and may authorize diplomas, certificates of proficiency, scholarship or other rewards to be given, after examination, in any of such subjects ; and may also impose reasonable fees for attendance.

Appointments to be made by the Lieutenant-Governor in Council.

6. The Lieutenant-Governor in Council may from time to time appoint a president and such professors, instructors, officers, assistants and servants as the Lieutenant-Governor in Council may deem necessary for the efficient working of said college, and the promotion of its usefulness, and may pass by-laws regulating and prescribing their respective duties.

7. There shall be two sessions in each year, and two terms in each session ; Sessions, terms the winter session shall open on the first day of October, and close on the and vacations. thirty-first day of March ; the summer session shall open on the sixteenth day of April, and close on the thirty-first day of August ; and the time between the closing and opening of the respective sessions shall constitute the regular vacations.

8. The Lieutenant-Governor in Council may agree with the University of Toronto for the affiliation of the said college with the said University, but only to the extent of enabling the students of the said college to obtain at the examinations of the said university such rewards, honours, standing, scholarships, diplomas and degrees in agriculture as the said university, under its statutes and the Acts of the Legislature in that behalf, may be allowed to confer. Affiliation of the college with the University of Toronto.

9. In connection with the college there shall be a museum of agriculture and horticulture, together with the scientific and technical branches relating thereto, in order to afford aids to practical instruction, and illustrations of the agricultural and horticultural products of the Province ; as well as a botanical and chemical laboratory to which vendors of seeds and artificial manures may send such seeds and manures, in order that after the proper inspection and tests their purity and strength may be reported for the benefit and protection of the agricultural community. Museum and laboratory.

10. It shall be lawful for the Lieutenant-Governor in Council on behalf of the Province to accept, hold and enjoy any gifts, bequests, or devises of personal or real property or effects which any person may think fit to make for the purposes of the said college, museum or laboratory. Gifts, bequests, etc., to college, museum or laboratory.

11. The Lieutenant-Governor in Council may make such regulations as may be deemed expedient touching the conduct of the students, and their attendance on public worship in their respective churches or other places of religious worship, and respecting their religious instruction by their respective ministers, according to their respective forms of religious faith, and every facility shall be afforded for such purposes. No religious test or profession required ; but all facilities given for acquiring religious training.

12. Full reports of the progress of the said college and farm shall be annually returned and submitted to the Legislative Assembly, which reports shall, amongst other things, contain :— Reports and returns to the Legislative Assembly.

(1) A tabular statement with the name and residence of each student attending in each session of the year, together with the name, residence and occupation of the parent or guardian, the number of classes that each student attended, and his progress and efficiency therein ;

(2) A return of the professors, instructors and assistants, with a summary of the instruction given by each ;

(3) A copy of the examination papers used in the sessional examinations, and the results thereof ;

(4) A summary of the operations in the various departments of the farm ;

(5) A clear and succinct account of the modes of procedure and results of the various experiments carried on during the year ;

(6) A detailed statement of the income and expenditure of the college and farm for the year ;

(7) A copy of all rules and regulations made during the year by the Lieutenant-Governor in Council, regarding the standard and mode of admission, the course of study and the course of apprenticeship ;

(8) A comparative statement showing the progress of the college and farm from year to year.

For the last four or five years the Ontario Agricultural College and Experimental Farm has been managed by two distinct heads—the President and the Farm Superintendent, who are to a large extent independent of each other. The President has absolute control inside, and the Farm Superintendent outside. Each is expected to work for the other; and neither is responsible for the discharge of his duties to any one but the Minister of Agriculture.

The outside work is divided into five departments—

- I.—THE FARM DEPARTMENT.
- II.—THE LIVE STOCK DEPARTMENT.
- III.—THE HORTICULTURAL DEPARTMENT.
- IV.—THE MECHANICAL DEPARTMENT.
- V.—THE EXPERIMENTAL DEPARTMENT.

For all these my colleague Professor Brown alone is responsible. He hires the men, directs the foremen, makes the purchases, and does whatever else he thinks necessary for the accomplishment of the object in view. His report, in the second part of this volume, contains a full account of the work done in the outside departments during the past year; and I have much pleasure in referring to it as a repository of valuable information on matters pertaining to agriculture.

The inside work, on the other hand, is embraced under three heads—

- I.—THE COURSE OF INSTRUCTION IN THE COLLEGE.
- II.—THE BOARDING HOUSE AND COLLEGE BUILDINGS.
- III.—THE BUSINESS DEPARTMENT.

For this I am directly responsible to the Commissioner of Agriculture, and through him to the Government of which he is a member. So, without further introduction, I beg to report as follows:—

I.—THE COURSE OF INSTRUCTION IN THE COLLEGE.

Before proceeding to report on the year 1881, I shall give the terms into which the year is divided, a list of the subjects taught, and the names of the professors and lecturers, with the work allotted to each. After that I shall speak of the year's operations as a whole, and then of each term separately.

The scholastic year commences on the 1st October, and ends on the 31st August. It is divided into two sessions, and each session into two terms:—

SESSIONS.

<i>Winter Session</i> —1st October to 31st March	{ Fall Term.
	{ Winter Term.
<i>Summer Session</i> —16th April to 31st August	{ Spring Term.
	{ Summer Term.

TERMS.

Fall Term—1st October to 22nd December.
Winter Term—5th January to 31st March.
Spring Term—16th April to 30th June.
Summer Term—1st July to 31st August.

SUBJECTS TAUGHT.

The regular course of study extends over a period of two years, and embraces the following subjects:—

FIRST YEAR.—*Agriculture, Live Stock, Inorganic Chemistry, Organic Chemistry, Veterinary Anatomy, Veterinary Materia Medica, Zoology, Structural and Physiological*

Botany, Geology and Physical Geography, English Literature and Composition, Book-keeping, Arithmetic, and Mensuration.

SECOND YEAR.—*Agriculture, Live Stock, Agricultural Chemistry, Veterinary Pathology, Veterinary Surgery and Practice, Systematic and Economic Botany, Entomology, Meteorology, English Literature, Political Economy, Book-keeping, Mechanics, Levelling and Surveying.*

The method of instruction is by lectures. Authors are read and studied in connection with the lectures on English Literature, Political Economy, and Botany; but in the other departments books are not used in the class-room, except for occasional reference.

THE STAFF.

1. JAMES MILLS, M.A., *President.*

English Literature, Political Economy, Structural and Physiological Botany, and Zoology.

2. WILLIAM BROWN, C.E., P.L.S.

Agriculture, Live Stock, and Arboriculture.

3. J. HOYES PANTON, M.A.

Chemistry (Inorganic, Organic and Agricultural), Geology, Physical Geography and Meteorology, Systematic and Economic Botany, Entomology.

4. J. P. McMURRICH, B.A.

(Lately appointed. Duties defined farther on.)

5. E. A. A. GRANGE, V.S.

Veterinary Anatomy, Pathology and Materia Medica, with the Practical Handling and Judging of Horses.

6. ALEXANDER McTAVISH, 1ST CLASS PROVINCIAL CERTIFICATE.

(Lately succeeded by WILLIAM NATTRESS, 1ST CLASS A PROVINCIAL CERTIFICATE.)

Arithmetic, Mensuration, Mechanics, Levelling, Surveying and Book-keeping.

THE YEAR 1881.

The year 1881 has not been marked by anything striking or unusual in the history of the College. It has rather been characterized by faithful work and substantial progress in the different departments of the institution. At the same time, it has not been altogether void of incident. I could speak of large additions to the library, the granting of diplomas for the first time, the appointment of a new professor, and other matters of special interest and importance; but it would interfere with the plan of my report to do so in this paragraph.

I think I may safely say that the institution is growing in favour at home and abroad. The applications for admission at the commencement of each session are more than we can accommodate. Several delegations from the neighbouring Republic have lately examined and approved our methods; and the farmers of Ontario have begun to urge the importance of a liberal outlay for the purpose of building a laboratory, constructing

suitable green-houses, and otherwise making more satisfactory provision for the efficient working of the several departments.

On looking over the list of students, I find that the attendance in 1881 has reached 217—1 from the United States, 1 from Bermuda, 1 from Ireland, 3 from New Brunswick, 3 from Scotland, 3 from Wales, 6 from Nova Scotia, 11 from England, 24 from the Province of Quebec, and 164 from Ontario,—i.e., 75½ per cent. of residents and 24½ non-residents.

From an examination of the college roll in appendix 1, it will be seen that the Ontario students come from all sections of the Province. The list embraces 31 counties and 7 cities. The County of York has 11 representatives, Oxford 10, Wellington 10, Carleton 8, Lanark 8, and Huron 7; Brant, Grey, Perth and Simcoe, 6 each; the City of Ottawa 14, Toronto 7, and Hamilton 4.

<i>Counties, etc.</i>	<i>Students.</i>	<i>Counties, etc.</i>	<i>Students.</i>
Brant	6	Middlesex	3
Bruce	3	Norfolk	4
Carleton	8	Northumberland	1
Durham	2	Ontario	3
Elgin	5	Ottawa	14
Frontenac	2	Oxford	10
Guelph	1	Peel	2
Glengarry	3	Perth	6
Grey	6	Peterboro'	2
Haldimand	2	Prince Edward	1
Halton	2	Renfrew	1
Hamilton	4	Simcoe	6
Huron	7	St. Catharines	2
Kingston	4	Toronto	7
Lambton	2	Victoria	2
Lanark	8	Waterloo	4
Leeds	2	Wellington	10
Lincoln	2	Wentworth	5
London	1	York	11
Total number of students in 1881			217
Number of Ontario counties represented			31

To this may be added a statement showing the numbers by which the different religious denominations have been represented in the institution during the past year :

Episcopalians	81
Presbyterians	70
Canada Methodists	33
Baptists	9
Roman Catholics	6
Congregationalists	4
Primitive Methodists	3
Lutherans	2
Plymouth Brethren	2
United Brethren	1
Episcopal Methodists	1
Friends	1
Unitarians	1
Jews	1
Universalists	1
Swedenborgians	1
Total	217

Lectures commenced on the 1st October and continued throughout the first three terms of the scholastic year 1880-81—from the 1st October to the 30th June. During that time all our regular students were engaged in class-room work and manual labour alternately—three hours a day having been spent at the former, and from three and a half to five at the latter. To this were added five hours in two weeks for set-up drill and gymnastics, under the very efficient drill instructor of the Wellington Field Battery. So that the daily routine of every student in the regular course, for nine months of the year, was—

Lectures in the College, three hours a day (excepting Saturdays).

Manual labour outside, three and a half to five hours a day.

Study in room, two hours a day.

Drill and Gymnastics, one hour a day (for five days of every alternate week).

While the first year students were at lectures in the College, the second year students were engaged outside. Those who went out to work in the forenoon, came in for lectures in the afternoon, and *vice versa*. Thus the theoretical work inside and the practical work outside went on simultaneously during the fall, winter and spring terms. The summer term (1st July to 31st August) was devoted entirely to work in the outside departments—the farm, the live stock, the garden, the carpenter-shop and experiments.

In order to place systematically and clearly before the readers of this Report an outline of the literary work done in the institution, I have drawn up the following syllabus of lectures delivered by the professors in the several departments and sub-departments during the last scholastic year, commencing on the 1st October, 1880, and ending the 31st August, 1881 :

OUTLINE OF CLASS-ROOM WORK.

(1st October to 30th June.)

FIRST YEAR.

FALL TERM—1ST OCTOBER TO 22ND DECEMBER.

Department 1.—Agriculture.

Introductory.—Ancient and modern agriculture ; agricultural literature ; arts and sciences affecting agriculture ; different kinds of farming.

Reclamation of Land.—Clearing, stumping, stoning, fallowing, etc.

Soils.—Origin and distribution of soil ; natural conditions of soil and plant ; examination and classification of soils ; physical and chemical properties of each kind.

Rotation in Cropping.—Importance and necessity of rotation ; principles underlying it ; rotations suitable to different kinds of soil ; examination and criticism of different systems of rotation.

Buildings.—Location of house, barn and stables : framing a building ; stables for horses, sheep and cattle ; arrangement of farm buildings.

Implements and Machinery.—Principles in construction of implements and machinery ; points to be aimed at ; classification, examination, and description of the same.

Miscellaneous.—Roads, lanes, fences, wells, etc.

Department 2.—Science.

Chemical Physics.—Matter ; accessory and essential properties of matter ; attraction ; various kinds of attraction—cohesion, adhesion, capillary, electrical and chemical ; specific gravity ; weights and measures ; heat, measurement of heat, thermometers,

pyrometers, specific and latent heat; sources, nature and laws of light; spectrum analysis.

Inorganic Chemistry.—Scope of subject; elementary and compound substances; chemical affinity; symbols; nomenclature: combining proportions by weight and by volume; atomic theory; atomicity of the most important elements; oxygen and hydrogen; water—its nature, functions, decomposition and impurities; nitrogen; the atmosphere—its composition, uses, and impurities; ammonia—its sources and uses; nitric acid and its connection with plants; carbon; combustion; carbonic acid and its relation to the animal and the vegetable kingdom; sulphur and its compounds; manufacture and uses of sulphuric acid; phosphorus; phosphoric acid and its importance in agriculture; chlorine—its bleaching properties; bromine; iodine; silicon; etc.

Zoology.—Nature of life; vital force; difference between animals and plants; morphology and physiology; homology and analogy: definition of species; classification; subdivisions of the animal kingdom; characters of the classes and most important orders of *Invertebrates*; general characters of *Vertebrates*; classes and orders, with a brief description of each.

Department 3.—Veterinary Science.

Anatomy and Physiology of the horse, ox, sheep and pig; osseous system, muscular system, syndesmology, plantar system, and odontology.

Department 4.—English.

Lectures on Composition.—The sentence, the paragraph, and the period; capitals and punctuation; style—its qualities and varieties. *Exercises in Composition.*

English Classics.—Critical study of Scott's "Lady of the Lake."

Department 5.—Mathematics.

Arithmetic.—Review of subject, with special reference to farm accounts; tables of weights and measures discussed; interest, discount, stocks and partnership.

Mental Arithmetic.—Calculations in simple rules, fractions, and compound rules.

FIRST YEAR—(*Continued*).

WINTER TERM—5TH JANUARY TO 31ST MARCH.

Department 1.—Agriculture.

Breeding, rearing, and feeding of animals. Points to be considered in deciding what kind of animals to keep.

Horses.—Different breeds of horses, and leading characteristics of each; type of horse required for farm work; breeding, feeding and general management.

Cattle.—History and characteristics of Shorthorns, Herefords, Polled Angus, Ayrshires, Jerseys, Devons, Galloways, etc.; grade cattle; milch cows—points of a good milch cow; breeding generally, cross-breeding, in-and-in breeding; pedigree.

Sheep.—Breeds of sheep generally considered; long-woolled sheep; medium-woolled sheep; short-woolled sheep; crosses between different breeds compared; texture, quality, quantity, and uses of different kinds of wool.

Swine.—Characteristics of various breeds; management of sows; stores; bacon-curing, etc.

Department 2.—Science.

Inorganic Chemistry.—Subject continued from fall term.

Organic Chemistry.—Constitution of organic compounds; alcohols, aldehydes, acids and their derivatives; formic, acetic, oxalic, tartaric, citric, lactic, malic, uric and tannic acids. Constitution of oils and fats—saponification; sugars, starch, cellulose; albuminoids, or flesh formers, and their allies; essential oils; alkaloids—morphine and quinine; classification of organic compounds.

Zoology.—Subject continued—Special study of *Infusoria*, *Scolecida* and *Insecta*. General characters of the *Vertebrates*—the various orders, with morphological and physiological distinctions of each, illustrated by common examples. Special study of the families of the *Aves* containing the insectivorous birds, and the families of the *Mammalia* containing the farm animals.

Department 3.—Veterinary Science.

Veterinary Anatomy.—Anatomy and physiology of the horse, ox, sheep and pig—digestive system, circulatory system, respiratory system, urinary system, nervous system, sensitive system, generative system, tegumental system.

Department 4.—English.

Lectures on Composition continued.—Common mistakes in speaking and writing discussed and corrected; most important figures of speech defined and illustrated.

Exercises in Composition continued.—Exercises in synthesis; abstracts of speeches and essays; letter writing.

English Classics.—Committing to memory and critical study of Scott's "Lady of the Lake."

Department 5.—Mathematics and Book-keeping.

Arithmetic.—Equation of payments; percentage; profit and loss; stocks; partnership; alligation; exchange.

Book-keeping.—Business forms and correspondence; general farm accounts; dairy, field, and garden accounts.

FIRST YEAR—(*Continued*).

SPRING TERM—16TH APRIL TO 30TH JUNE.

Department 1.—Agriculture.

Preparation of Soil.—Modes of preparation for different crops, as wheat, barley, oats, rye, pease, maize; modes suited to various kinds of soil.

Seeds and Sowing.—Testing the quality of seed; changing seed; quantity of seed per acre; methods of sowing.

Improvement of Lands.—Ordinary cultivation; subsoiling in some cases; fallowing; draining; manuring. Farm yard manure, and management of the same; the properties, application and uses of artificial manures—lime, plaster, salt, bone-dust, superphosphates, etc.

Roots.—Cultivation of roots and tubers—turnips, mangolds, carrots, potatoes; effects of each kind on soil.

Green Fodders.—Tares, lucerne, sainfoin, prickly comfrey, clovers, grasses; the cultivation and management most appropriate for each.

Management of pastures; harvesting and preparing crops for market or one's own use; crops of current year examined.

Department 2.—Science.

Geology.—Connection between geology and agriculture; classification of rocks—their origin and mode of formation, changes which they have undergone after deposition; fossils—their origin, inferences from their presence in rocks; geological periods and the characteristics of each. Geology of Canada, with special reference to the nature and economic value of the rock deposits; glacial period and its influence in the formation of soil. Lectures illustrated by numerous diagrams and specimens.

Physical Geography.—Scope of the subject—earth's place in space, external and internal conditions, atmosphere, ocean, land; superficial configuration of Ontario; theory of springs; classification of lakes; zones of animal and vegetable life.

Botany.—Structural and physiological botany; internal structure of plants—cells and vessels; structure and development of the external parts of plants—root, stem, leaf, flower, seed, fruit; physiology of cells and vessels—chlorophyll, starch, gum, sugar, crystals, etc.; movements of fluids in plants, respiration, nutrition, reproduction; hybridization; modes of propagation; propagation of *varieties* by grafting, budding, layering and division; diseases of plants—smut, rust, mildew, etc.

Department 3.—Veterinary Science.

Materia Medica.—The preparation, doses, action, and uses of about one hundred of the principal medicines used in veterinary practice.

Department 4.—English.

Lectures on the subject, and class-room exercises in business correspondence, etc.

English Classics.—Committing to memory and critical study of Goldsmith's "Deserted Village."

Department 5.—Mathematics.

Mensuration.—Mensuration of surfaces—the square, rectangle, triangle, trapezoid, regular polygon, circle, sector, segment, etc. Special application to the measurement of lumber. Mensuration of solids—tetrahedron, cube, prism, cylinder, spherical segment, spherical zone, paraboloid, frustrum of paraboloid, spheroid, circular segment of spheroid, etc. Special application to the measurement of timber, earth, etc.

SECOND YEAR.

FALL TERM—1ST OCTOBER TO 22ND DECEMBER.

Department 1.—Agriculture.

Experimental Plots.—The results of last season's experiments with wheat, oats, barley, pease, grasses, clovers, roots, etc.; liability to disease; effects of various manures on different crops; growth of plants, etc.

Farm Management.—Detailed account of the treatment of each field; results from different kinds of seed and soil; effects of manure; harvesting, storing, and threshing of crops; fall ploughing; subsoiling, etc.

Stock-Feeding.—Value of feeding materials ; estimate for winter keep of live stock ; housing, feeding, and fattening ; points to be observed in selecting animals for fattening ; feeding experiments ; common diseases of animals ; management of animals on pasture ; value of green fodder. Dairy management and cheese-making.

Department 2.—Science.

Agricultural Chemistry.—Connection between chemistry and agriculture : the various compounds which enter into the composition of the bodies of animals ; the chemical changes which food undergoes during digestion ; chemical changes which occur during the decomposition of the bodies of animals at death ; the functions of animals and plants contrasted : food of plants, and whence derived ; origin and nature of soils ; classification of soils : causes of unproductiveness in soil and how detected ; composition of different plants in relation to the soils upon which they grow ; rotation of crops ; preservation, development, and renovation of soils : manures classified, the chemical action of manures on different soils ; chemical theories in reference to the action of superphosphates ; the action of lime in the decomposition of double silicates ; feeding of animals ; classification of foods ; chemical results in the use of different foods ; points necessary to be considered in order to obtain the full value of artificial and natural foods.

Meteorology.—Relation of Meteorology to Agriculture ; composition and movements of the atmosphere : nature and manipulation of the barometer, its importance in forecasting the weather ; temperature, description of the various instruments used in its measurement and how to use them ; solar and terrestrial radiation ; the influence of forests on climate ; mists, fogs, clouds, rain, hail, and snow ; description of instruments used in measuring rain and snow fall ; velocity and direction of wind ; causes affecting climate ; influence of climate on vegetation.

Department 3.—Veterinary Science.

Pathology.—*Osseous System*—Nature, causes, symptoms, and treatment of diseases of bone, as splint, spavin, ringbone, etc.

Muscular System—Nature, causes, and treatment of flesh-wounds, etc.

Syn-desmology—Nature, causes, symptoms, and treatment of bog-spavin, curb, and other diseases of the joints.

Plantar System—Nature, causes, symptoms, and treatment of corns, sand-crack founder, and other diseases of the foot.

Odontology—Diseases of the teeth and treatment of the same.

Department 4.—English.

Lectures.—Etymological, syntactical, and rhetorical forms of the English language ; history of its formation, its connection with other languages ; rhetorical figures ; their use and abuse ; prose and poetic diction.

Composition.—Essay writing ; familiar and business correspondence.

English Classics.—Critical study of Shakespeare's "Julius Cæsar."

Department 5.—Mathematics.

Statics.—The mechanical powers ; friction ; the steam engine ; strength of materials ; units of work ; etc.

Drainage.—General principles ; discharging water-ways ; how, where, and when to commence draining ; depth of drains and distance apart ; furrow drains ; draining followed by other improvements ; drainage implements ; levelling.

SECOND YEAR—(*Continued.*)

WINTER TERM.—5TH JANUARY TO 31ST MARCH.

Department 1.—Agriculture.

Laws affecting agriculture : capital required in farming, laying out of farm ; general management and economy : measuring, levelling and draining : permanent pastures ; inventory and valuation ; cost of production : buying, selling, and marketing : field experiments.

Management of cattle, sheep and other animals in winter ; breeding generally considered ; special management of ewes before, during, and after the season of lambing ; treatment of other animals in parturition : rearing of lambs, calves, and pigs ; washing and dipping sheep, etc., etc.

Arboriculture.—Planting and attendance of forest trees, shade trees, etc.

Department 2.—Science.

Agricultural Chemistry.—Subject continued from Fall Term.

Entomology.—Anatomy of insects ; geographical distribution and classification of insects ; metamorphosis of insects ; insects injurious to vegetation, their habits and the best methods of checking and preventing their ravages—all illustrated by a good collection of specimens.

Department 3.—Veterinary Science.

Digestive system—nature, causes, symptoms and treatment of spasmodic and flatulent colic, inflammation of the bowels, acute indigestion, tympanitis in cattle, impaction of the rumen, and many other common diseases.

Circulatory system—description of the diseases of the heart and blood vessels.

Respiratory system—nature, causes, symptoms, and treatment of catarrh, nasal-bleet, roaring, bronchitis : pleurisy, inflammation of the lungs, etc.

Urinary system—nature, causes, symptoms, and treatment of inflammation of the kidneys, etc.

Nervous system—nature, causes, symptoms, and treatment of lock-jaw, string-halt, etc.

Sensitive system—nature, causes, symptoms, and treatment of the diseases of the eye and ear.

Generative system—nature, causes, symptoms, and treatment of abortion, milk-fever, etc.

Tegumental system—nature, causes, symptoms, and treatment of scratches, sallenders, mallenders, parasites, and other diseases of the skin.

Department 4.—English and Political Economy.

Lectures.—Lectures on accuracy, purity, propriety, clearness, precision, strength, and grace ; varieties of style described ; false syntax discussed and corrected.

Composition.—Exercises in impromptu composition and letter writing continued.

English Classics.—The critical study of Shakspeare's "Macbeth."

Political Economy.—Utility ; production of wealth—land, labour, capital ; division of labour : distribution of wealth : wages ; trades-unions ; co-operation ; money ; credit, credit cycles ; functions of government : taxation ; etc.

Department 5.—Mathematics.

Dynamics.—Motion, forces producing motion, momentum, etc.

Hydrostatics.—Transmission of pressure ; the hydraulic press ; specific gravity, density ; pumps, siphons, etc.

Road-Making.

SECOND YEAR—(*Continued.*)

SPRING TERM.—16TH APRIL TO 30TH JUNE.

Department 1.—Agriculture.

Review of all past lectures with special drill on outside work. Reasons for management, etc.

Department 2.—Science.

Systematic and Economic Botany.—Subject defined; principles considered in the classification of plants—plants classified; orders containing the plants of greatest importance to the agriculturist described; plants classified in regard to their economic value for food, medicine, fabrics, forage, timber, etc. The course illustrated by a large collection of well preserved plants.

Practical and Analytical Chemistry.—Chemical manipulation, preparation of common gases and reagents; operations in analysis—solution, filtration, precipitation, evaporation, distillation, sublimation, ignition, and the use of the blow-pipe; testing of substances by reagents; impurities in water; adulterations in foods and artificial manures; injurious substances in soils.

Quantitative analysis of soils, manures, and farm produce.

Department 3.—Veterinary Science.

Materia Medica.—The preparation, actions, uses, and doses of medicines—continued from the Spring Term of the first year. Lectures on special subjects, such as pleuropneumonia, the rinderpest, tuberculosis, etc.

Department 4.—English.

Lectures.—Taste, characteristics of taste, standard of taste; pleasures of the imagination—their sources, viz., the novel, the wonderful, the picturesque, the sublime, the beautiful; wit, humour, ridicule, etc.

Composition.—Business forms and correspondence; general letter-writing, etc.

English Classics.—The critical study of Milton's "L'Allegro" and "Il Penseroso."

Department 5.—Mathematics and Book-keeping.

Surveying.—Fields surveyed with chain and cross-staff; heights and distances found by the theodolite.

Book-keeping.—Review of previous work; laws relating to farming—deeds, mortgages, notes, etc., with laws relating thereto.

Having spoken thus briefly of the year 1881 as a whole, I now proceed to report more at length on the work of each term separately. As already intimated, the scholastic year began on the 1st October, 1880, and ended on the 31st August, 1881, while the financial year began on the 1st January and ended on the 31st December; and for this reason it is somewhat difficult to make our reports intelligible to ordinary readers. The following arrangement of the terms will, perhaps, illustrate what I mean:—

<i>Scholastic Year</i> —	{	Fall Term (1880)	}	<i>Financial Year.</i>
		Winter Term (1881)		
		Spring Term “		
		Summer Term “		
		Fall Term “		

From this it will be seen that the financial year embraces the last three terms of one scholastic year and the first term of another. The scholastic year commences with the fall term, and the financial year with the winter term. Hence the confusion which arises in the minds of some.

The Fall Term of 1880, *i.e.*, the first term of the scholastic year, having been treated of in last year's report, I shall begin with

THE WINTER TERM OF 1881.

5TH JANUARY TO 31ST MARCH.

The students in attendance were those who had entered at the commencement of the Fall Term in October, 1880, or previous to that date—126 in number; and the work was to a large extent a continuation of the subjects begun at that time.

LECTURES.

The regular students of the first year had a course of 165 lectures on the different subjects prescribed for the Winter Term—thirty on Agriculture and Live Stock, thirty-three on Chemistry, twenty-two on Veterinary Anatomy, thirty-three on English Literature and Composition, twenty on Zoology, twenty on Arithmetic, and seven on Book-keeping. During the same time the second year students attended 143 lectures, and spent twenty-two hours in the practical handling and judging of cattle, sheep and horses, under the supervision of the veterinary surgeon and the professor of agriculture. The subjects and lectures were: Agriculture and Live Stock, seventeen lectures; Arboriculture, five; Agricultural Chemistry, thirty-three; Entomology, eleven; Veterinary Pathology, twenty-two; Political Economy, twenty-two; English Literature, eleven; Natural Philosophy and Road-making, twenty-two.

"COURSE OF APPRENTICESHIP."

Regarding the course of apprenticeship in practical work, I may say that during the past year the students were regularly and systematically sent in rotation to all the outside departments, *i.e.*, to the farm, the live stock, the garden, the carpenter-shop, and the experimental department, so that it was in the power of everyone, who was at all industrious, to get a fair knowledge of whatever is to be learned in each department.

During the winter months it is sometimes difficult to find work of a kind suitable for the purposes of instruction. The experimental department is quiet, there is not much to do on the farm, and very little in the garden; consequently more time is devoted to the mechanical and live stock departments in the Winter Term than at any other season of the year. In this way not only is the difficulty met, but special opportunities are afforded the young men for learning the use of carpenter's tools, and acquiring a practical knowledge of the best methods of feeding and managing the ordinary farm animals.

LIVE STOCK.

In this department, the first year students devoted three hours a week to the study of the characteristic points and peculiarities of the leading breeds of sheep, pigs and horses, while the second year men spent one hour a week in handling, judging and comparing the different breeds and varieties of sheep and cattle. The method of instruction was the same as usual, and may be described as follows:—

A specimen of some kind, say a Shorthorn steer, is brought into the lecture-room, which is so arranged with galleried seats that every student, while in his place taking notes, has a full view of the lecturer and all his movements. The different parts of the animal are first pointed out and named, such, for example, as the brisket, crops, loins, twist, etc. After this has been several times repeated, the students are called on to point out and name the several parts in presence of their class-mates. The lecturer then

criticises the animal more closely, indicating the strong and the weak points, and giving his estimate of it as a whole. Afterwards several animals of different breeds are brought in together, and he proceeds to describe and illustrate what are considered the good points of an animal for beef and for milk, comparing and contrasting Shorthorns, Herefords, Aberdeen Polls, Devons, Galloways, Ayrshires, and Jerseys—breed with breed in regard to shape of frame, quality of flesh, feeding, beefing, milking, hardiness, and other properties. Much the same course is pursued with the different breeds of sheep. Cotswolds, Leicesters, Southdowns, Oxford Downs, Shropshire Downs, and Merinos are frequently examined in the class-room, and compared with one another as regards carcass, constitution, wool, mutton, feeding, hardiness, etc. Thus the instruction in this department is made in the strictest sense definite and practical.

NATURAL SCIENCE.

In the department of Natural Science I have to report as I did last year, that good work has been done; but that the results would have been better and much more satisfactory to all concerned, if the institution had been provided with a good laboratory and apparatus suitable for making the experiments which constitute so large a part of the instruction in this important department. The professor of chemistry did all that any chemist could do, but he was much hindered by the utter insufficiency of our eight by twelve laboratory and its scanty equipment. The first year students, after completing the inorganic chemistry which they had studied throughout the Fall Term, took up the somewhat difficult but interesting subject of organic chemistry. A full course of lectures was delivered, embracing all the important organic compounds, while special attention was paid to the nature and sources of sugar, starch, oils, fats, the albuminoids or flesh-formers, and other substances which have a more or less direct bearing on agriculture and stock-raising. At the same time they received lectures from another professor on zoology, the object of which was to give them a general view of the whole animal kingdom, and thus make them more intelligent and appreciative students of particular parts of that kingdom under the heads of entomology and veterinary science. While the students of the first year were thus employed, those of the second year were attending lectures on agricultural chemistry and entomology. During the previous term they had learned the relation of chemistry to agriculture, and with this knowledge they now proceeded to study the nature and sources of plant food, the origin and properties of the different kinds of soil, their preservation and renovation, the causes of unproductiveness, artificial fertilizers and farm-yard manure, the chemical composition of various fodders, and the nutritive value of each. With such subjects as these, they were occupied three hours a week, and spent one hour a week in examining specimens of the various insects which infest our crops and fruits, and in studying the best known means of checking and preventing their ravages.

VETERINARY SCIENCE.

As will be seen from the syllabus of lectures given on a previous page, the Winter Term in the veterinary department is devoted to the anatomy, physiology, and pathology of the horse, ox, sheep and pig. The lectures to the first year students were on the anatomy and physiology of these animals, and were illustrated by the complete skeleton of a horse and portions of other skeletons. Those delivered to the students of the second year, discussed various diseases and their treatment, especially the common ailments of the horse, as spavin, ringbone, curb, founder, inflammation and such like. Here again, for the purpose of making the instruction thoroughly practical, horses were regularly brought into the class-room and examined, first by the professor in presence of the class, and afterwards by the students themselves. Thus the veterinary surgeon was each day enabled to see whether his lectures were really understood by those to whom they were delivered. This part of the work, I am pleased to say, was heartily entered into and much appreciated by the second year men.

ENGLISH LITERATURE AND POLITICAL ECONOMY.

Our course of study is still the same, and the same subjects are emphasized. We spend no time on Latin, Greek, French or German; and not much on anything which has not a direct bearing on the ordinary duties of a Canadian farmer. The time may come when it will be proper to add drawing, elocution, and, perhaps, French or German to the list of studies; but at present it seems wise to resist the temptation in that direction. We give all the subjects of the programme a fair share of attention, but lay most stress on agriculture, live stock, chemistry and veterinary science. Our primary aim is to make good practical farmers; but we are not forgetful of the fact that it is no less important to make good citizens—to add some of the graces and refining influences of a broader culture, and thereby fit our students for filling positions of trust, influence and respectability in church and state.

The kind of education which enables a man to make the most of his abilities in the social circle, the municipality, or the political arena, is not got by confining the attention to any single subject, but by reading, writing and conversation, with the sharpening and refining influence of many studies. At the same time, I think there is nothing else which contributes so much to that end, and tends so directly to create and foster a taste for reading, as frequent practice in composition and the critical reading of selections from the best English authors; and for this reason we devote all the time we can spare to that department.

During the Winter Term of 1881, the first year students spent one hour a week in writing letters and impromptu compositions, and two hours in the critical study of Scott's "Lady of the Lake." The second year men read Shakespeare's "Julius Cæsar," committing to memory the best passages, and devoted considerable attention to the study of Political Economy. Land, labour and capital passed under review; and some of the great problems connected with protection, free trade, and the functions of government were freely and warmly discussed.

MATHEMATICS AND BOOK-KEEPING.

In this department, the first year students commenced the study of book-keeping on the 5th of January, and continued that of arithmetic from the Fall Term. In the former, the master in charge having devoted special attention to the subject, gave a valuable course of lectures and a number of exercises on what may be called farm book-keeping—farm, field, garden and dairy accounts; in the latter, particular stress was laid on the commercial part of the subject, and the solution of such problems as are required in the business of the farming community. At the same time the second year students were engaged in the study of dynamics, hydrostatics, and road-making. The principles learned in hydraulics were applied in studying the construction and working of pumps, siphons, hydraulic rams and presses; and under the head of road-making, several matters of importance were discussed, such as road materials, the construction of various kinds of roads, lanes and walks—macadamized, gravel, plank, etc.; also the relative cost and value of each, under a variety of conditions. In this way the young men were interested in what might appear a very common place subject, and were led to see how our country roads might be greatly improved, without much additional cost, if the principles of grading and drainage were generally understood and acted upon.

THE HORTICULTURAL DEPARTMENT.

In the course of the past year there have been better opportunities for instruction and learning in this department than at any time previous. The additions made by the fruit growers of Ontario to our list of trees and shrubs have greatly enlarged the field for observation and illustration.

During the winter months the second year students received instruction in grafting, budding, layering, and potting. They also made a special study of our hot-house plants;

and at the close of the term most of them succeeded in passing a satisfactory examination on the following paper:—

SESSIONAL EXAMINATIONS—EASTER, 1881.

SECOND YEAR.

HORTICULTURE.

Examiner: JAMES FORSYTH.

1. Describe how hybridizing takes place naturally, how it may be accomplished artificially, and how hybridized varieties are perpetuated.

2. Describe the usual mode of propagating greenhouse plants, the material necessary, and the temperature required.

3. In the collection of plants before you, name—

(a) The monœcious plants.

(b) Those with perfect flowers.

(c) Those with endogenous stems.

4. Describe a soil suitable for potting a large number of greenhouse plants.

5. What is a double flower, and wherein does it differ from a single flower of the same species.

6. Make a selection of six plants suitable for window culture, giving the common and the scientific name of each.

7. Name four insects which commonly attack greenhouse plants, and state how they may be destroyed.

8. Identify the plants before you, giving the common and the scientific name of each—

(a) Name the orders to which they respectively belong.

(b) Describe fully plants 2 and 5.

THE MECHANICAL DEPARTMENT.

In this department nothing new has been done, except the introduction of a circular saw for dressing posts and rafters, and ripping boards to any required width. Our shop is a very plain one, with three or four benches, and an outfit of such tools as are required for repairing and general carpenter work. The students are sent to this department, as to all the others, in rotation. They are first taught the use of the different tools, and afterwards employed in doing a variety of work, such as is constantly needed on the farm—making gates, waggon tongues, whipple-trees, etc., and repairing fences, barns and College buildings. Such is the regular routine, and last winter was no exception to the general rule.

SPECIAL STUDENTS.

From an examination of appendix 7, it will be seen that we have a special course for the convenience of farmers' sons who wish to attend lectures during the fall and winter months, and return home about the first April, in time for the spring work on their own farms. Such students, doing little or no outside work, are able to take in two terms all the lectures that regular students get in three terms. The following statement will explain what I mean:—

REGULAR STUDENTS.

Fall Term—1st Oct. to 22nd Dec. }
Winter Term—5th Jan. to 31st Mar. } Lectures half-day and work half-
Spring Term—16th April to 30th June. } day, alternately.
Summer Term—1st July to 31st Aug.—Work all day on “Experimental Farm.”

SPECIAL STUDENTS.

Fall Term—1st October to 22nd December. }
Winter Term—5th January to 31st March. } Lectures six hours a day.
Spring Term—16th April to 30th June. }
Summer Term—1st July to 31st August. } Work at home on their own farms.

Last year we had eighteen young men in this course—eight first and ten second year men. They attended lectures, one half of the day, with the regular students of their own year ; and the other half, when the regulars were employed outside, they (the specials) had lectures by themselves on the work of the Spring Term. Thus, by omitting the labour outside and giving the professors extra work inside, they were enabled, during the Fall and Winter Terms, to take not only the lectures of those terms, but also the lectures of the Spring Term as well. The “Special Time Table,” in appendix 2, shows the lectures delivered to the first and the second year specials on the work of the Spring Term. Time tables 1 and 2, in the same appendix, contain a list of the subjects which they took with the regular students in the Fall Term.

EASTER EXAMINATIONS.

The Easter Examinations always embrace the work of the Winter Session (1st Oct. to 1st April). Those of last year commenced on the 18th March and continued till the end of the month. The questions set on that occasion will be found in appendix 3. They are difficult enough to test the knowledge of the best students, but of such a character as to give every honest worker a fair chance to pass. The answers were carefully valued, and the candidates arranged in three classes according to the percentage of marks taken.

All below 33 per cent.				“plucked.”
33 per cent. to 49 per cent., inclusive				3rd class or passed.
50 “ 74 “ “				2nd class honours.
75 “ 100 “ “				1st class honours.

A complete record of all the candidates will be found in the class-lists (appendix 4) — not only those who passed or won honours, but also those who failed. A fair proportion got first-class honours in one or more subjects, and a few gained the high rank of first-class men in one or more of the five departments.

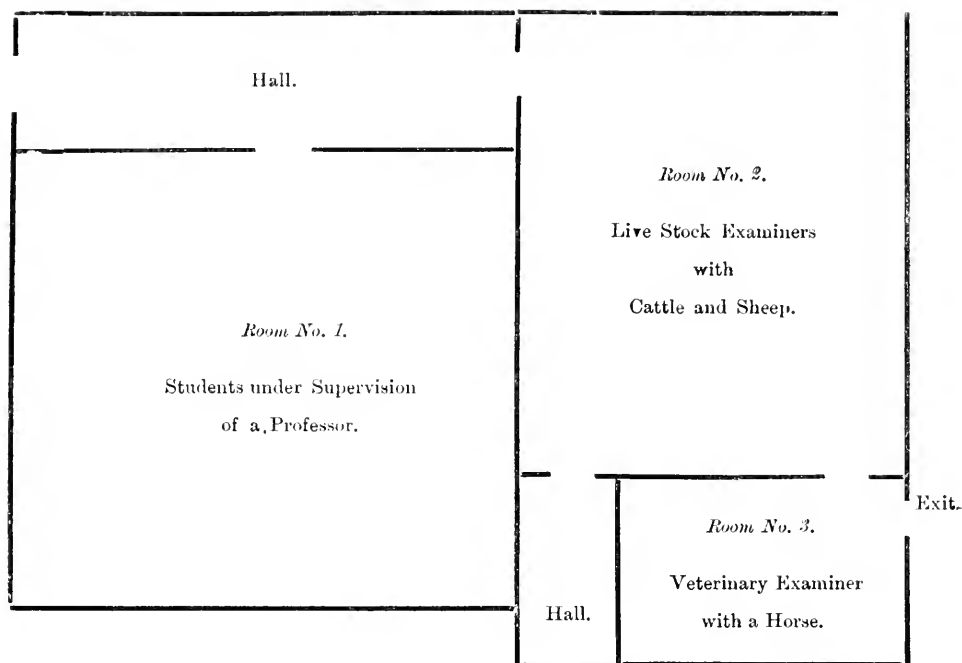
FIRST CLASS MEN IN THE DEPARTMENTS.

DEPARTMENTS.		FIRST YEAR.	DEPARTMENTS.		SECOND YEAR.
	Agriculture and Live Stock.	1. McArthur, J. 2. Stonehouse, M. 3. Shuttleworth, A. 4. Gibson, R.	I.	Agriculture and Live Stock.	1. Phin, R. J. 2. Motherwell, W. R. 3. Phin, W. E. 4. Ross, J. G. 5. Dickinson, C. S. 6. Leask, J. 7. Ballantyne, W. W.
II.	Natural Science.	1. McArthur, J. 2. Stover, J. W. 3. Barclay, E. H.	II.	Natural Science.	1. Phin, R. J. 2. Motherwell, W. R. 3. Phin, W. E. 4. Ross, J. G.
III.	Veterinary Science.	1. McArthur, J. 2. Jones, G. B.	III.	Veterinary Science.	1. Phin, R. J. 2. Phin, W. E. 3. Ross, J. G. 4. Newton, J. 5. Motherwell, W. R.
IV.	Eng. Lit. and Composition.	1. McArthur, J. 2. Barclay, E. H.	IV.	English Literature and Political Economy.	1. { Motherwell, W. R. 2. Ross, J. G. 3. Dickinson, C. S. 4. Phin, R. J. 5. Grindley, A. 6. Phin, W. E.
V.	Mathematics.	1. McArthur, J. 2. Bignell, E.	V.	Mathematics.	1. { Motherwell, W. R. 2. Ross, J. G. 3. Phin, R. J. 4. Ballantyne, W. W. 5. Phin, W. E.

LIVE STOCK ORAL EXAMINATION.

In my last report I called your attention to the fact that we had given the students a practical examination in the department of live stock. We did so, because we had discovered that it was possible for a young man to study books and copy notes of lectures till he could write very sensible answers to questions on any class of animals, and after all be utterly unable to describe or judge intelligently any particular specimen. The same plan was adopted last Easter. After the students had spent seven hours in writing answers to questions on agriculture and live stock, they were all subjected to an oral examination—the first year men on cattle and sheep, and the second year men on cattle, sheep and horses.

The animals to be handled and judged were taken into two rooms—cattle and sheep into one, and a horse into the other. The students were admitted one at a time; and when each had spent the allotted number of minutes in examining the animals and answering the questions, he passed out, and another took his place. The following diagram indicates the relative positions of the rooms used, and shows more clearly than words how the examination was conducted:



The class to be examined was sent early in the morning to room No. 1 in charge of a professor. At the hour for commencing the examination, the first student went from No. 1 to No. 2, to meet the live stock examiners. When through with them, he went to No. 3, to examine and judge an unsound horse; and from No. 3 he passed out of the building, to be succeeded by another.

The time occupied was four days; and although the work was tedious and fatiguing to the examiners, the results were quite satisfactory. The experience of 1880 bore excellent fruit in 1881. The candidates were better prepared, and the answers were much more prompt and intelligent.

PRIZE LIST.

EASTER EXAMINATION, MARCH, 1881.

First Year.

Agriculture.—1. McArthur, J. 2. Stonehouse, M.
 Natural Science.—1. McArthur, J. 2. Stover, J. W.
 Veterinary Science.—1. McArthur, J. 2. Jones, G. B.
 English Literature.—1. McArthur, J. 2. Barclay, E. H.
 Mathematics and Book-keeping.—1. McArthur, J. 2. Bignell, E.
 General Proficiency.—1. McArthur, J. 2. Poe, J. P. 3. Stover, J. W.

Second Year.

Agriculture.—1. Phin, R. J. 2. Motherwell, W. R.
 Natural Science.—1. Phin, R. J. 2. Motherwell, W. R.
 Veterinary Science.—1. Phin, R. J. 2. Phin, W. E.
 English Literature and Political Economy.—1. Motherwell, W. R., and Ross, J. G., (equal). 3. Dickinson, C. S.
 Mathematics.—1. Motherwell, W. R., and Ross, J. G., (equal). 3. Phin, R. J.
 General Proficiency.—1. Phin, R. J. 2. Motherwell, W. R. 3. Ross, J. G. 4. Phin, W. E. 5. Ballantyne, W. W. 6. Dickinson, C. S. 7. Grindley, A.

SPRING TERM.

16TH APRIL TO 30TH JUNE.

All the special students, and generally a few others, leave at Easter. Hence it has been found necessary to hold two Matriculation Examinations in the year; one on the 1st of October, and another on the 16th of April. To fill the places of those who left last Easter, thirty-four were admitted. They were examined on the 16th and 17th April; and lectures commenced on the 18th.

As the spring term affords special opportunities for practice in the outside departments, the class-room work did not receive quite so much attention as during the winter term. Every one had to attend lectures three hours a day as usual; but a little less time was occupied in study than during the winter months. From four and a half to five hours a day were devoted to practical work outside, a part of which was spent with the instructor, and the balance with the foremen of the several departments. By the instructor, I mean one of our men who spends most of his time in teaching the students how to perform such operations as they require to understand before taking full charge of a farm—harnessing and driving horses, ploughing, sowing, harrowing, rolling, mowing with scythe, driving a mower and such like. The young men are sent to him in rotation, according to our knowledge of what they require; and while under his instruction they get no wages. Hence they are generally anxious to learn as quickly as possible, so that they may be in a position to claim the promised pay for their work.

While particular prominence was given to practical work outside, the theoretical work inside was by no means neglected. In the department of agriculture the cultivation of the various crops was taken up; seeds were examined and judged; the different modes of sowing discussed and exemplified; the principles underlying rotation, and the rotations suitable to different soils, climates, and circumstances were explained; also the improvement of land by ordinary cultivation, subsoiling, fallowing, manuring, and laying down to grass. At the same time, under the head of practical and analytical chemistry, the second year men were employed from three to four hours a week in the laboratory, examining and testing waters, soils, foods, manures, and samples of farm produce. In that way they were led to see the practical value of what they had already learned in inorganic, organic, and agricultural chemistry. They had opportunities for putting their knowledge to a practical test; and hence they entered cheerfully and heartily into the work. So far all right; but the more earnest and anxious the students became, the more Professor Panton, our chemist, felt himself hampered by the want of accommodation and proper appliances in the little room which has been dignified with the name of "Laboratory." In systematic and economic botany they received lectures on the general classification of plants, and studied more particularly those orders which contain the most important agricultural and economic plants—cereals, grasses, roots, and plants used in the manufacture of fabrics, oils, medicines, and other articles of commerce. At the same time the first year students were attending lectures on geology and botany. In the former they learned something of the formation, composition, and character of the soils found in the country; in the latter, they studied the plant in relation to the soil and the atmosphere—its form, food, functions, and diseases, giving special attention to hybridization, the different modes of propagation, and such diseases as smut, rust, mildew, etc. The lectures of the class-room were illustrated and applied as far as possible by the gardener while the students were at work with him in the green-houses, gardens, and lawns. In the departments of veterinary science, English, and mathematics, the work was carried on as during the winter term. The first year students had twenty-four lectures on the preparation, action and doses of about fifty kinds of medicine commonly used in veterinary practice; studied Goldsmith's "Deserted Village," and committed to memory the greater part of it; wrote familiar and business letters; began the study of mensuration; and continued that of book-keeping from the previous term. During the same time, the second year men took lectures on twenty-five or thirty additional medicines and the therapeutics of the veterinary art; read critically, and committed to memory Milton's "*L'Allegro*" and "*Il Penseroso*;" gave some attention to farm book-keeping; and went

twice a week into the fields with a master to apply what they had previously been taught under the heads of levelling, surveying, and drainage. The term closed with a six days' written examination on the class-room work and a practical examination on various operations in the outside departments.

The time had now arrived when it was necessary to decide who was entitled to the second silver medal which His Excellency the Governor-General had offered for competition among the students of the second year.

THE GOVERNOR-GENERAL'S SILVER MEDAL.

The terms of competition were as follows :—

“1. All competitors must be second year students.

“2. They shall compete—

“(1) By a written examination at Easter on all the class-room work of the fall and winter terms.

“(2) By a similar written examination at the end of June on all the class-room work of the spring term.

“(3) By practical examinations at the above dates on cattle, sheep, pigs, horses, and the various operations taught or performed on the farm, in the garden or in the carpenter shop.

“3. The successful competitor must reach the required standard in the inside and the outside departments separately, that is, must make at least thirty-three per cent. of the marks in each subject, and an aggregate of not less than sixty-seven per cent. of the total number of marks in all the subjects prescribed for second year students.”

One of the most difficult questions to solve in every progressive educational institution is how to conduct examinations so as to do full justice to all concerned. If students are examined by their own teachers or professors, however thoroughly and honestly the work is done, the public does not place full confidence in the results; and honours awarded by such examiners are apt to be discounted more or less to the disadvantage of the recipients. If, on the other hand, all examinations are conducted by outside parties, the work of education in the lecture-room is interfered with; for the lecturer must follow the examiner and teach to suit the examinations, or his lectures will be neglected. Hence it sometimes happens that an able lecturer—a man who thoroughly understands where to lay the stress in a course of study, is at the mercy of some tyro who wants to show the world what he knows about the mysteries of certain subjects. Of course this difficulty vanishes where none but thoroughly competent examiners are appointed.

Recognizing the evils and the benefits on the one side and on the other, I thought the best results would be secured by combining the two plans. Consequently I arranged so that the Easter examinations, on the work of the winter session, were conducted wholly by the professors of the College, and the June examinations, on the work of the summer session, almost entirely by outside examiners. The marks obtained at these two examinations were added together, and the sum used to determine the standing in general proficiency. Not having funds to pay examiners for their work, I had to impose on the kindness and good nature of the following gentlemen, whose names are a sufficient guarantee throughout the Province that the results of the June examinations are thoroughly reliable :

EXAMINERS OF SECOND YEAR STUDENTS, JUNE, 1881.

Agriculture	Professor Buckland, University of Toronto.
Live Stock	“ “ “ “
Practical Handling and Judging of Cattle and Sheep	F. W. Stone, Guelph, and James Anderson, Pushlinch.
Practical and Analytical Chemistry	P. H. Bryce, M.A., M.D., Guelph.
Systematic and Economic Botany	“ “ “

Veterinary Materia Medica	Dr. Smith, Veterinary College, Toronto.
Practical Handling and Judging of Horses ..	“ “ “
English Literature	W. Tytler, B.A., Guelph.
Levelling and Surveying	A. A. McTavish, 1st Class Prov. Certificate.
Ploughing	James Anderson, Puslinch, and Evan McDonald, ald, Guelph Township.
Mowing	Prof. Brown and Evan McDonald.
Sowing by Hand	“ “
Sheep Shearing	Professor Brown.
Garden Operations	James Forsyth.
Carpenter Work	James McIntosh.

These gentlemen kindly gave us their assistance without any remuneration whatever; and for that assistance I beg to thank them on behalf of the students, the professors, and the Commissioner of Agriculture.

The competition for the medal was very keen. Four or five of the competitors were strong men; and although the summing up of all the figures indicated clearly who was entitled to the prize, the examiners felt that any one of the first five would have done honour even to a gold medal.

RANK OF COMPETITORS FOR MEDAL.

(1) Easter Examinations.	(2) June Examinations.	(3) June Examinations (Live Stock and Outside Work.)
1. Phin, R. J.	1. Ross.	1. Phin.
2. Motherwell, W. R.	2. Phin.	2. Motherwell.
3. Ross, J. G.	3. Motherwell.	3. Grindley.
4. Ballantyne, W. W.	4. Ballantyne.	4. Ross.
5. Grindley, A.	5. Grindley.	5. Ballantyne.

GENERAL PROFICIENCY INSIDE AND OUTSIDE EXAMINATIONS.

EASTER AND JUNE.

- 1. R. J. Phin, Hespeler, (Medallist).
- 2. W. R. Motherwell, County Lanark.
- 3. J. G. Ross, Montreal.
- 4. W. W. Ballantyne, Stratford.
- 5. A. Grindley, Montreal.

CLOSING EXERCISES.

PRESENTATION OF PRIZES AND MEDAL, GRANTING OF DIPLOMAS.

On the 30th day of June, a number of friends from Guelph and the surrounding neighbourhood met at the College to witness the closing exercises. Short addresses were delivered by James Innis, Editor of the *Guelph Mercury*; P. H. Bryce, M.A., Rev. Mr. Howie, Rev. Mr. Westmacott, and others. Several gentlemen took part in distributing the prizes which had been awarded on the results of the Easter examinations; and Professor Buckland of Toronto University, on behalf of the Commissioner of Agriculture, presented the Governor-General's silver medal to R. J. Phin, a son of one of the leading farmers in the County of Waterloo.

The question of granting degrees, or diplomas, had been under consideration for some time; but no formal action was taken till last year. I am strongly opposed to giving degrees of any kind, unless to those who have passed through a somewhat extensive course of study, and are, in the proper sense of the word, *master* of all the subjects embraced in that course. I have no hesitancy in saying that the work at the Ontario Agricultural College is done as thoroughly as at any other institution in the country; but I do not think that the cause of agriculture would be helped, or our reputation improved, by granting degrees at the end of a two years' course. Hence I recommended the Commissioner not to make bachelors of agriculture, but to give a diploma admitting to the status of *associate of the College* every student who completes the course of study and passes satisfactorily all examinations on the subjects contained in the curriculum, and on the work of his apprenticeship. Such a diploma was prepared and granted to the successful candidates.

We determined at the outset not to cheapen the diploma by giving it to any who failed in the slightest degree to reach the standard fixed by our regulations. Hence, out of thirty-seven candidates, only nine were successful.

ASSOCIATES OF THE ONTARIO AGRICULTURAL COLLEGE.

Ballantyne, W. W.	Stratford, Ont.
Dickinson, C. S.	England.
Grindley, A. W.	Montreal.
Motherwell, W. R.	County of Lanark.
Phin, R. J.	Hespeler, Co. of Waterloo.
Phin, W. E.	" " "
Pope, Herbert	County of Grey, Ont.
Ross, James G.	Montreal.
Robins, W. P.	"

VISITORS.

MEMBERS OF PARLIAMENT.

In the month of February last, the Hon. S. C. Wood, Commissioner of Agriculture, and about forty other members of Parliament paid us a visit. On their arrival at Guelph they were met by the President of the College, the aldermen of the city, and the representatives of the press. The whole company at once proceeded to the College, where they were welcomed by the officers of the institution. The members of the House having come, not merely for pleasure, but in order to acquaint themselves practically with the *modus operandi* of the College, and see what use is being made of the money which they vote us from year to year, proceeded at once to the work of inspection. They examined the class-rooms, reading-room, library, dormitories, and gymnasium, but seemed to enjoy most of all their visit to the new dining-hall. After dinner, and a few words of encouragement from the Commissioner of Agriculture, Mr. Lauder, and others, some time was spent in examining the green-houses, barns, and live stock of the farm. It was then about three o'clock, and the party returned to the City of Guelph. I may say, in a word, that the visit was a very pleasant one, and I have no doubt it will be productive of much good.

CORNELL STUDENTS AND OTHERS.

On the 17th and 18th May, we were favoured with a very pleasant visit from Professor Roberts, of Cornell University, who has charge of the department of Agriculture in that institution. He was accompanied by his wife, daughter, and fifteen of his students, and came for the purpose of making a thorough inspection of our College and mode of working. When that object was accomplished we drove them to see the well known herds of Messrs. Stone, Rudd, Watt, Armstrong, and Hunter, in this county, after which they started for Bow Park, professing themselves well-pleased and much profited by what they had seen and heard.

Nearly a month later we had Mr. Goold, Secretary of the Connecticut State Board of Agriculture, and a Mr. Olcott, who were sent as a committee to investigate our system, and report to the Legislature of their State. They did their work in a day and a half, and the result of their report is that the State of Connecticut has established an agricultural college which more closely resembles ours than any other institution at present in existence.

FARMERS.

I think I am correct in saying, as I did last year, that many erroneous notions about the College are still entertained by a large number of farmers; and one is that regarding their relation to the maintenance of the institution. They are quite willing that the Government should vote hundreds of thousands for the support of asylums, prisons, and reformatories; and they do not seem to inquire very closely whether the money voted for such institutions is properly expended or not. But every dollar spent on the Ontario Agricultural College and Experimental Farm they regard as a direct addition to their taxes; and hence some of them oppose the whole concern, altogether irrespective of what it does or leaves undone. They are surprised and incredulous when told that it has not affected their taxes to the amount of one cent in the last five years, and that they would not pay a farthing less, if it were blotted out of existence to-morrow. Gradually, however, the idea is gaining ground that the interest of the country at large, and especially of the farming community, is, not to destroy or injure the College, but to correct what needs correction and make it thoroughly efficient in every respect. Personally, I have no objection whatever to the keenest criticism. If we were not well watched and closely criticised we might grow careless. The Farm was purchased and the College established to promote the interests of Agriculture and Stock-raising in the Province. Therefore, farmers, more than any other class, have a right to visit the institution, inquire into its working, criticise, and make suggestions from time to time. Those who have done so are generally our best friends. Mistakes have been corrected and prejudices removed.

On the 21st, 22nd, and 27th, June, we had seven large excursions of farmers, chiefly from the counties of Middlesex, Oxford, Wentworth, Simcoe, and Grey, under the auspices of the Northern Fair Association, Norwich Agricultural Society, South Simcoe E. D. and Essa Branch Agricultural Society, and the Grange organizations of Grey, Simcoe, and Wentworth.

The time of the excursionists was occupied in examining the College, the farm, the live stock, the garden and the experimental plots. Some found fault and others professed to be well pleased; but all agreed in urging that the Government should support the institution liberally, and make it as efficient as possible. Short addresses were delivered by leading agriculturists, and a resolution passed at the close of each day's proceedings.

NORTH MIDDLESEX AGRICULTURAL SOCIETY.

(Resolution.)

"At a meeting of the Executive Committee of the Northern Fair, held on Monday 11th July, 1881, it was unanimously resolved:—

"1. That the thanks of the North Middlesex Agricultural Society be and are hereby tendered to James Mills, Esq., M.A., the President of, and Professor W. Brown, the Manager of the Model Farm, for the courtesy shown by Messrs. Mills and Brown to the members of this Society and their friends upon the occasion of this Society's excursion to Guelph on June 21st, 1881, and more especially for their very lucid and patient explanations of the experiments heretofore conducted at the Model Farm, both in stock and in crops.

"2. That as an agricultural society, we do heartily endorse the course pursued at the Model Farm, not only in agricultural and breeding experiments, but as an agricultural training school of great benefit and utility to the future welfare of this Province.

"(Signed) A. A. McARTHUR,

"President.

"E. B. SMITH,

"Secretary of the North Middlesex Agricultural Society."

GREY DIVISION GRANGE.

(Resolution.)

"Mr. A. Gifford, Secretary of 'Grey Division Grange,' rose to move a resolution, and in doing so gave his reasons. He had always felt a great interest in the Agricultural College, because he thought the education of farmers' sons should be obtained in such a way that they would not be withdrawn from the pursuit of farming, and because he had observed that the teaching and course of study in our High Schools, as a general rule, imbued young men with desires to leave the farm and enter some of the over-crowded professions. He held views perhaps more radical than the Principal, in regard to the subjects which should be taught in the College. He thought it was necessary to have several other branches in addition to English and the purely technical subjects which make up the course of study; and he hoped to see the day when the institution would not only be chartered but endowed, and have power to grant degrees in agriculture. He had great pleasure in moving 'that the thanks of those present be tendered to the managers for their attention and cordiality, and for raising the institution to the level which it now occupies,' and he expressed the hope that they would endeavour to raise it to a higher level every year. Mr. Joseph Goodfellow seconded the resolution, which was unanimously carried."

SOUTH SIMCOE E. D. AND ESSA BRANCH AGRICULTURAL SOCIETY.

(Resolution.)

The following resolution was moved by C. Cooke, Treasurer, seconded by John Ross, President, and carried:—

"That we, the officers and directors of the South Simcoe E. D. and Essa Branch Agricultural Society, beg to tender our sincere thanks to Messrs. Mills and Brown, managers of the Ontario Agricultural College and Experimental Farm, for the very courteous manner in which we have been received and entertained by them on the present occasion of our first excursion to this institution, and our high appreciation of the very systematic and orderly manner in which the said institution is conducted, and which we believe is a credit to Ontario, and must eventually be productive of much good to the farming community."

The Wentworth Division Grange also passed a resolution of thanks to the officers; but as it expresses no opinion regarding the College or Farm, I shall not trouble you by repeating it. The other resolutions are quoted in order to show our readers and legislators that many of the farmers are beginning to take an interest in the College, and to urge the importance of making it thoroughly efficient in every department.

SUMMER TERM.

1ST JULY TO 31ST AUGUST.

At the close of the spring term (30th June), when the year's lectures were over, several of the farmers' sons returned home to work on their own, or their fathers' farms in haying and harvest. Sixty-five remained with us, working nine and a half hours a day in the summer term (July and August). As at all other times, they were sent in rotation to the several departments, giving, of course, the largest share of their time where it was most needed, *i.e.*, on the farm. I shall not weary you with a detailed account of the routine in each department, but simply say that the young men received instruction in the fields, the yards, the gardens, and the shop. They spend a portion of their time in a special class for the purpose, learning how to dig, plough, harrow, sow, shear sheep, mow, cradle, drive a reaper, bind, shock, and such like; and did all there is to do in the summer months, on a four hundred acre grain and stock farm, and in the management of a large vegetable garden, flower garden, orchard, and lawn.

HARVEST HOME.

The term closed on the 26th August, with the Annual Athletic Sports and Harvest Home Procession. For several weeks previous, the young men occupied their evenings on the College campus in walking, running, jumping, putting the stone, and other exercises which tend to give character and muscle to a nation. Professor Philp's excellent band was employed to furnish music; and not less than a thousand visitors were present to witness the games. The weather was favourable; everything passed off pleasantly, and all seemed well-pleased with the entertainment furnished by the various tests of strength and speed. After the games came the Harvest Home Procession around the College grounds, and the presentation of the prizes by Mrs. Mills and Donald Guthrie, M.P. Thus terminated the scholastic year 1880-81.

FALL TERM.

(*Scholastic Year, 1881-82.*)

1ST OCTOBER TO 22ND DECEMBER.

The fall term opened on the 1st October with the full complement of students. Every vacancy was filled, and some parts of the building crowded, in order to meet the wishes of a number who made very earnest appeals for admission when it was almost too late. Eighty-two old students returned, and forty-seven new ones were admitted. Of the latter number, one is a graduate of a University, one an undergraduate, and twenty are students of High Schools; so that only twenty-five out of the forty-seven had to pass our matriculation examination.

The names of those now in attendance will be found in the second part of appendix I.

The following lists show where they came from, and the religious denominations to which they belong:—

Counties, etc.	Students.	Counties, etc.	Students.
Bermuda	1	Montreal City	3
Brant	4	Middlesex	2
Bruce	2	Nova Scotia	6
Carleton	6	New Brunswick	3
Durham	1	Norfolk	2
England	8	Ottawa City	7
Elgin	5	Oxford	8
Frontenac	3	Ontario	1
Grey	4	Peel	2
Guelph City	1	Peterboro'	1
Glengarry	2	Perth	3
Hamilton City	2	Quebec	5
Haldimand	2	Scotland	2
Huron	3	Simcoe	5
Halton	1	Toronto City	2
Kingston City	2	Victoria	1
London City	1	Waterloo	2
Lincoln	3	Wales	2
Leeds	2	Wellington	5
Lambton	2	Wentworth	3
Lanark	2	York	8

Total number in attendance during fall term..... 129

Number of Ontario counties represented..... 28

RELIGIOUS DENOMINATIONS.

Episcopalians	50
Presbyterians	39
Canada Methodists	17
Canada Baptists	3
Plymouth Brethren	3
Lutherans	2
Roman Catholics	2
Primitive Methodists	1
Episcopal Methodists	1
Quakers	1
Jews	1
Unitarians	1
Universalists	1
Swedenborgians	1
Total	129

We admit students at the age of fifteen years, but experience has convinced us that the standard should be raised to sixteen or seventeen. At present the range is from fifteen to twenty-five—one at fifteen, three at twenty-two, five at twenty-three, two at twenty-four, and one at twenty-five; leaving one hundred and seventeen between the ages of sixteen and twenty-one. The majority are seventeen, eighteen, or nineteen. The following table gives the exact numbers at the different ages:—

AGES OF STUDENTS AT THE ONTARIO AGRICULTURAL COLLEGE IN THE FALL TERM
OF 1881.

1 at the age of	15 years.
17 " "	16 "
28 " "	17 "
25 " "	18 "
28 " "	19 "
13 " "	20 "
6 " "	21 "
3 " "	22 "
5 " "	23 "
2 " "	24 "
1 " "	25 "

Total—129; average age, 19 years.

The time tables in appendix 2 indicate the subjects which are taken up in the fall term, and the number of hours allotted to each. Lectures commenced on Tuesday, the 4th October, and continued without interruption till the 17th December.

The first-year students received two lectures a week on the characteristic points and peculiarities of the different breeds of cattle; had a full course with experiments on chemical physics and inorganic chemistry; commenced the subject of zoology, and spent some time in studying the anatomy and physiology of the horse. Under the head of English and mathematics, they read Goldsmith's "Deserted Village," wrote compositions once a week, and reviewed certain portions of arithmetic with special reference to the requirements of farming in Canada.

The attention of the second-year men was directed to such subjects as stock-breeding, farm management, and the experimental plots—the selection of animals for beef; the housing, feeding, and fattening of the same; the comparative values of pasture and green fodder; results from the different kinds of seed, soil, and manures; and the previous

season's experiments with wheat, oats, and grasses. They had several lectures on meteorology, and a full course on agricultural chemistry—the composition of different plants in relation to the soils on which they grow; the preservation and renovation of soils, the chemical composition and value of different manures, the superphosphates, double silicates, and other substances which furnish plant food. They spent two hours a week at lectures on veterinary pathology, and one in handling and examining horses for spavin, ring-bone, splint, founder, and other diseases—all under the eye and direction of our veterinary surgeon, Dr. Grange; they also read Shakspeare's "Julius Cæsar," and devoted some time to the study of applied statics, levelling, surveying, and drainage.

TERMINAL EXAMINATIONS, DECEMBER, 1881.

The regular examinations on the term's work commenced on the 17th, and ended on the 21st December. The questions were not particularly difficult; but having now decided to give every successful candidate a diploma at the end of the course, we exercised the utmost diligence to prevent the use of any illegitimate help, and examined the answers with the determination not to pass any who failed to reach the required standard. Thirty-two first-year, and seventeen second-year men passed in all the subjects of the examination. A number of others took a high stand in certain subjects which they liked, but failed in one or more which they disliked. The honour-list, and the names of the successful candidates having been published in the newspapers, I shall not introduce them here; I may, however, give a fuller outline of the work covered by the examinations:—

OUTLINE OF CLASS-ROOM WORK.

FALL TERM.

FIRST YEAR.

DEPARTMENT 1.—AGRICULTURE.

Introductory.—Ancient and modern agriculture; agricultural literature; arts and sciences affecting agriculture; different kinds of farming.

Reclamation of Land.—Clearing, stumping, stoning, fallowing, etc.

Soils.—Origin and distribution of soil; natural conditions of soil and plant; examination and classification of soils; physical and chemical properties of each kind.

Rotation in cropping.—Importance and necessity of rotation; principles underlying it; rotations suitable to different kinds of soil; examination and criticism of different systems of rotation.

Buildings.—Location of house, barn and stables; framing a building; model stables for horses, sheep and cattle; arrangement of farm buildings.

Implements and Machinery.—Principles in construction of implements and machinery; points to be aimed at; classification, examination and description of the same.

Miscellaneous.—Roads, lanes, fences, wells, etc.

DEPARTMENT 2.—NATURAL SCIENCE.

Chemical Physics.—Matter, accessory and essential properties of matter; attraction, various kinds of attraction—cohesion, adhesion, capillary, electrical and chemical; specific gravity; weights and measures; heat, measurement of heat, thermometers, pyrometers, specific and latent heat; sources, nature and laws of light; spectrum analysis.

Inorganic Chemistry.—Scope of subjects; elementary and compound substances; chemical affinity; symbols; nomenclature; combining proportions by weight and by volume; atomic theory; atomicity of the most important elements; oxygen and hydrogen; water—its nature, functions, decomposition, and impurities; nitrogen; the atmosphere—its composition, uses and impurities; ammonia—its sources and uses; nitric acid and its connection with plants; carbon; combustion; carbonic acid and its relation to the animal and the vegetable kingdom; sulphur and its compounds; manufacture and uses of

sulphuric acid ; phosphorus ; phosphoric acid and its importance in agriculture ; chlorine —its bleaching properties ; bromine ; iodine ; silicon, etc.

Zoology.—Nature of life ; vital force ; difference between animals and plants ; morphology and physiology ; homology and analogy ; definition of species ; classification ; subdivisions of the animal kingdom ; characters of the sub-kingdoms, classes, and most important orders ; special study of *vermes*.

DEPARTMENT 3.—VETERINARY SCIENCE.

Anatomy and Physiology of the horse, ox, sheep and pig ; osseous system, muscular system, syndesmology, plantar system, and odontology.

DEPARTMENT 4.—ENGLISH.

Composition.—Impromptu exercises once a week.

English Classics.—Committing to memory, and critical study of Goldsmith's "Deserted Village."

DEPARTMENT 5.—MATHEMATICS.

Arithmetic.—Review of subject, with special reference to farm accounts ; tables of weights and measures discussed ; interest, discount, stocks and partnership.

Mental Arithmetic.—Calculations in simple rules, fractions and compound rules.

SECOND YEAR.

DEPARTMENT 1.—AGRICULTURE.

Experimental Plots.—The results of last season's experiments with wheat, oats, barley, peas, grasses, clovers, roots, etc. ; liability to disease ; effects of various manures on different crops ; growth of plants, etc.

Farm Management.—Detailed account of the treatment of each field, results from different kinds of seed and soil ; effects of manure ; harvesting, storing, and threshing of crops ; fall ploughing ; subsoiling, etc.

Stock-feeding.—Value of feeding materials ; estimate for winter keep of live stock ; housing, feeding, and fattening ; points to be observed in selecting animals for fattening ; feeding experiments ; common diseases of animals ; management of animals on pasture ; value of green fodder. Dairy management and cheese-making.

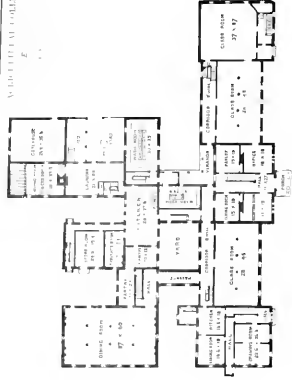
DEPARTMENT 2.—NATURAL SCIENCE.

Meteorology.—Relation of meteorology to agriculture ; composition and movements of the atmosphere ; nature and manipulation of the barometer, its importance in forecasting the weather ; temperature, description of the various instruments used in its measurement and how to use them ; solar and terrestrial radiation ; the influence of forests on climate ; mists, fogs, clouds, rain, hail, and snow ; description of instruments used in measuring rain and snow fall ; velocity and direction of wind ; causes affecting climate ; influence of climate on vegetation.

Agricultural Chemistry.—Connection between chemistry and agriculture ; the various compounds which enter into the composition of the bodies of animals ; the chemical changes which food undergoes during digestion ; chemical changes which occur during the decomposition of the bodies of animals at death ; the functions of animals and plants contrasted ; food of plants and whence derived ; origin and nature of soils ; classification of soils ; causes of unproductiveness in soil and how detected ; composition of different plants in relation to the soils upon which they grow ; rotation of crops ; preservation, development and renovation of soils ; manures classified ; the chemical action of manures on different soils ; chemical theories in reference to the action of superphosphates ; the

AGRICULTURAL COLLEGE

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SECOND FLOOR PLAN

AGRICULTURAL COLLEGE,

GENERAL PLAN

Scale, 10 Feet to an Inch

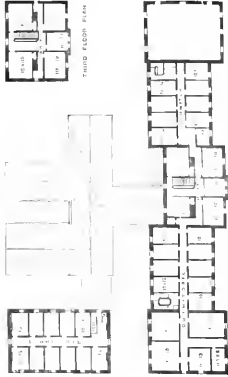


FIRST FLOOR PLAN

AGRICULTURAL COLLEGE,

GENERAL PLAN

Scale, 10 Feet to an Inch



THIRD FLOOR PLAN

action of lime in the decomposition of double silicates ; feeding of animals ; classification of foods ; chemical results in the use of different foods ; points necessary to be considered in order to obtain the full value of artificial and natural foods.

DEPARTMENT 3.—VETERINARY SCIENCE.

Veterinary Pathology.—*Osseous System*—nature, causes, symptoms, and treatment of diseases of bone, as splint, spavin, ringbone, etc.

Muscular System—nature, causes, and treatment of flesh wounds, etc.

Synovismology—nature, causes, symptoms, and treatment of bog spavin, curb, and other diseases of the joints.

Plantar System—nature, causes, symptoms, and treatment of corns, sand-crack, founder, and other diseases of the foot.

Dontology—diseases of the teeth and treatment of the same.

DEPARTMENT 4.—ENGLISH LITERATURE.

English Classics.—Critical study of Shakespeare's "Julius Caesar."

DEPARTMENT 5.—MATHEMATICS.

Mental Arithmetic.—Calculations in reduction, fractions, and analysis.

Statics.—Forces ; the mechanical powers ; friction ; the steam-engine ; strength of materials ; units of work, etc.

Levelling and Draining.—General principles ; discharging water ways ; how, where and when to commence draining ; depth of drains and distance apart ; furrow drains ; draining followed by other improvements ; drainage implements, etc.

II.—THE BOARDING HOUSE AND COLLEGE BUILDINGS.

For the information of those who have not seen the College buildings, I shall quote a paragraph from my last report, and refer to the description prepared by the Government architect last year :

COLLEGE BUILDING.

"The college building, as shown on frontispiece, is a plain substantial structure without much claim to architectural beauty. Like the institution itself, it was built little by little without any very definite idea of the shape it might ultimately assume. When the Government first bought land and determined to establish an agricultural college, the architect drew plans for a building which would have suited the purpose exactly, but the cost seemed too great and the country was not prepared for it, consequently it was decided seven years ago to commence work with a few students in Mr. Stone's farmhouse. Additions and alterations were made from time to time as the number of students increased, till the result is, the building which you see outlined and described by the Government architect in Appendix 6—altogether different from what was originally intended ; and though it is not what we would like, it nevertheless affords considerable accommodation, and serves the purpose very well.

"In the building, as it now stands, there are one hundred and twenty-two rooms—three class-rooms, a reading-room, a library, a room to be fitted up for a museum, a laboratory, two offices, a public reception-room, sixty-two students' dormitories, a large dining-hall, a servants' dining-room, a store-room, pantry, kitchen, scullery, laundry, drying-room, eight bath-rooms, nine bed-rooms for servants, the messenger's room, a parlor and bed-room for the Matron, a sitting-room and bed-room for the Assistant Resident Master, nine rooms in the left wing occupied as a dwelling house by the Professor of Agriculture, six rooms in the centre occupied by the President and his family, three wash-rooms, an engine-room and a coal-house. The size, position, and use of each

room can be better understood from an examination of the plans above referred to than from a verbal description. Hence I shall not attempt anything more elaborate under this head."

BOARDING HOUSE.

In the boarding-house, nothing special has occurred during the past year. Things have moved along as usual. Our supplies are provided by contract; and generally speaking the quality of the articles furnished has been satisfactory. The Matron has discharged faithfully and very efficiently the many and arduous duties of her department. The Assistant Resident Master has taken charge of the students at meals and assisted me in looking after them in the halls and dormitories. Altogether, the work has been done satisfactorily.

DAILY ROUTINE.

In regard to the surroundings of our students in the college, and the duties required of them, I may say that their bed-rooms are furnished with beds, bedding, bureaus, mirrors, wash-stands, study-tables, and chairs. They sleep separately, two in a room, and in a few instances three. The daily routine during the fall, winter, and spring terms, is as follows:—

All are required to rise at a quarter to six, make their beds and put their rooms in order. At half-past six they go to breakfast; and at seven the students of one division are sent to work outside, and those of the other employ their time as they feel disposed, till eight o'clock. From eight to nine the latter are at drill or gymnastics, and from nine to twelve at lectures in the class-room. Both divisions then return to the boarding-house, and prepare for dinner at half-past twelve. The bell rings at half-past one, and the division that was in at lectures in the forenoon, goes out to work in the afternoon. The other division is free till two o'clock. From two to five it attends lectures; and at five both divisions return again to the boarding-house to prepare for tea at half-past five. From tea time to seven o'clock, and in spring to eight o'clock, they generally rest or take exercise. From seven to nine in fall and winter, and from eight to half-past nine in spring, they study in their rooms under the supervision of a master. At nine or half-past nine, according to the season of the year, they proceed to roll-call and evening prayers; all lights are put out at ten, and doors closed at half-past ten. Every student who is not under ban for some misdemeanour, is allowed out one evening in the week, till half-past ten. To some parents perhaps this will appear late; but, as it takes not less than thirty minutes to come from the city to the college, any earlier hour would scarcely give sufficient time. When going out, each student leaves his name with the master in charge, and is required to report himself on his return, that we may know whether all are in or not before the doors are closed for the night.

Such is the routine in the boarding-house, and such are the duties required of the students therein, during nine months of the year. As the months of July and August are devoted entirely to work in the outside departments, the duties inside differ but little from those of an ordinary boarding-house on a large scale.

DISCIPLINE.

Where you have one hundred and thirty young men full of animal spirits boarding and lodging in the same building, it is by no means easy to maintain proper discipline. It is indeed a very difficult task, and one which imposes on those who are responsible, a load of care and anxiety from which there is no escape night or day. It requires kindness, firmness, tact, constant vigilance, and sometimes stern severity.

The conduct of our students is, generally speaking, good. Some, of course, do not work so well as they should, and a few are both idle and troublesome; but the great majority are quiet, industrious, and well-behaved young men. Whenever I find one persistently idle and mischievous, or vicious, I send him home, because my experience is that such boys almost invariably get worse instead of better, where they have so many

companions. Since my last report was written, I have found it necessary to dismiss twelve—one for idleness and disobedience, one for violation of rules and insulting impertinence, one for idleness and swearing, one for repeated insolence and disrespect to officers, and eight for persistent idleness, constant violation of rules, and bad conduct generally. I may say that very few of the number had the slightest intention of doing anything when they came to the college. Their influence was bad from the first, and I bore too long with them; but at last I decided to make a thorough cleaning out. I did so, and since that time we have had honest work and little or no trouble.

III.—THE BUSINESS DEPARTMENT.

Under this head there is a variety of work for which the President and the Bursar are chiefly responsible—correspondence, books and accounts, general business, and the finances.

Correspondence.

The correspondence does not vary much in character from year to year, except that it requires more attention as the institution grows. It consists chiefly in sending out circulars, distributing reports, and answering inquiries about terms of admission, course of study, duties of students, cost of board and tuition, books used, books recommended, etc. In 1881 I distributed 1,600 copies of our last Annual Report, sent out about 1,000 circulars, and wrote nearly 1,800 letters. A report was sent early in the year to every Agricultural College in Britain and the United States; soon after to every Grange in the Dominion, and, since that time, to every person who applied for a copy.

Books and Accounts.

The Bursar, as financial agent of the institution, is responsible for the work under this head. It is his duty to examine all accounts against the College and the Farm, to check them by invoices and requisitions, to charge each item under the proper heading, and make out separate statements for the College and the Farm once a month, submitting the former to the President and the latter to the Farm Superintendent for approval, and then to forward both to the Treasury for payment. He receives and accounts for all moneys from the College, the Farm, and the Treasury Department, and pays all accounts that have been approved by the President or the Farm Superintendent, and passed by the Auditor. He also keeps three distinct sets of books—

No. 1, showing the monthly expenditure under each head of the appropriation for salaries, wages, and College expenses.

No. 2, giving in detail the revenue and expenditure of the outside departments under three heads—(1) the farm and carpenter shop, (2) the garden, (3) the experimental department.

No. 3, showing the account of each student from the day he enters the College till he leaves it—tuition fees, board and washing, amounts allowed for labour, and cash balances paid the College for board and washing.

“Printed sheets containing the names of all the students are furnished each foreman daily, who fills in the blanks with the description of the work done that day by the students in his department, the number of hours each has worked, and the estimated value of such work. These are filed daily in the office, and journalized weekly. At the end of the financial month these sums are posted to the credit side of each student's account in the ledger, whilst on the debit side is placed the cost of the board and washing for that month, obtained from the books of the store-room and the laundry. At the end of the session these sheets are bound together and make the day-book for that session.” Two hundred and seventeen such accounts were opened in the year 1881.

General Business.

In addition to his duties as book-keeper, the Bursar has to provide supplies for the boarding-house and take charge of the store-room. He is required to examine and weigh the meat and groceries as they are delivered, and see that the quality of all articles furnished by tender is up to the standard required by the terms of contract. The President signs requisitions for all purchases, takes charge of the College buildings generally, and is responsible not only for the management but for the discipline of the inside departments, as regards both officers and students.

In the month of June last, Mr. Thomas Johnston, who had held the office of Bursar for three or four years, was removed by death, and friends were left to mourn the loss of one of the truest and noblest young men that I have ever met. His intellect was vigorous, his memory strong, and his character without a stain. He was prompt, honourable, and scrupulously honest in all his dealings. His death was a real loss to the institution.

Mr. G. E. Thomas, of Toronto, was appointed Bursar soon after Mr. Johnston's death, and discharged the duties of the office very efficiently and satisfactorily till about the middle of October, when he became suddenly ill, and was so seriously affected in health and strength that he found it necessary to resign the position, and return to Toronto, where he is so well and favourably known.

Mr. Thomas was succeeded by Mr. A. T. Deacon, who is now doing his best to master the details of his varied duties. He finds the work and responsibility much heavier than he anticipated, but I have no doubt he will prove himself equal to the occasion.

Finances.

As the farm revenue and expenditure come under the report of my colleague, Professor Brown, I make no reference whatever to the one or the other in this statement. The financial tables in Appendix 5 are a summary of the College and boarding-house accounts for the past year. The first shows the expenditure; the second, the revenue; the third, the amount required for 1882; and the fourth, the College account with the Farm and Garden for 1881.

The sum of \$20,030 was voted for maintenance last year, but it was on the supposition that the revenue would reach \$8,500, so that the total amount which I was authorized to spend was \$28,530. Fearing, however, that the revenue would fall short of the sum named, I thought it prudent not to incur any expenditure which could be avoided till near the end of the year, when I would be in a position to estimate more correctly the probabilities as to the amount of revenue; and the following statements show how unwise it would have been to have pursued any other course:—

Sum voted for maintenance in 1881	\$20,030 00
Estimated revenue in 1881	8,500 00
	<hr/>
	\$28,530 00
 Sum voted for maintenance in 1881	 20,030 00
Actual revenue in 1881	7,384 16
	<hr/>
	\$27,414 16
 Amount which the President was authorized to expend in 1881	 28,530 00
Amount actually expended in 1881	27,573 62
	<hr/>
Balance	\$956 38

Table No. 2 is a brief statement of the College revenue for the year 1881, amounting to \$7,384.16, and composed of the following items:—

Tuition fees	\$3,522 75
Fees for Supplemental Examinations	64 00
Balances on board accounts	3,742 41
Other sources (<i>see</i> Table No. 2)	55 00

Total College Revenue in 1881 \$7,384 16

This amount subtracted from the expenditure shows the net cost of the institution for the last twelve months:

Gross expenditure in 1881	\$27,573 62
Revenue in 1881	7,384 16

Net expenditure in 1881 \$20,189 46

Nearly two-thirds of the College expenditure is for the board, washing, and lodging of students. The amount expended under that head last year was not far from \$17,000. Of course we charge for board and washing, but the allowances for labour in the outside departments are deducted from these charges. The Farm Superintendent, with the help of his foremen, decides what each student is to get for his work, and that amount, whatever it may be, is deducted from his board bill. The more each is allowed outside, the less he has to pay inside. Thus the Farm controls the College revenue; and, therefore, it is quite impossible for me or anyone else to say what the revenue for 1882 will be. The amount allowed for students' labour last year was \$5,202.61. If this were added to our revenue, the net expenditure for the year would be reduced to \$14,986.85, thus:—

Gross expenditure in 1881	\$27,573 62
Revenue in 1881	\$7,384 16
Paid for students' labour on Farm	5,202 61

12,586 77

Balance \$14,986 85

Item VI. in Table No. 1 is an unforeseen expenditure which I could not well avoid. As the number of students increased, the requests for hand-books, cyclopedias, books on agriculture, etc., became so numerous and frequent that I could scarcely refrain from doing something; and not having any vote for the library, all I could do was to draw on the appropriation for other purposes in order to meet the demand for books. This is my explanation of the \$356.53 found under the head referred to. The item of \$2,000.03, at the end of the same table, was expended in purchasing furniture and furnishings for the dormitories constructed last year.

In the right-hand column of Table 3 will be found the estimated expenditure for the year 1882. The amount asked for the expenses of the boarding-house is the same as was voted last year, but there is a small increase in "Salaries and Wages," most of which is accounted for as follows:—

During the last year of Mr. Johnston's incumbency, and the first of mine, the task of looking after the students at night, so as to secure order and attention to studies, was performed by the President, the Assistant Resident Master, and the Professor of Chemistry; but a new wing was added to the building, the centre portion was raised another story, a separate three-story building was erected in the rear, the number of students was nearly doubled, and the Professor of Chemistry moved down town. The result was that the duties of the President and his Assistant were very much increased. The old wing had to be looked after as before, and the work of lecturing was no less, while the new wing to the south, the new story in the centre, and the new building in the rear, had to be kept under control—all with less help than was employed when everything

was centred in one wing. In a word, the duties were increased by one-half and the help diminished by one-third. I took charge four nights out of seven, and my Assistant, Mr. Mactavish, three nights, till about eleven o'clock. At length, after a year and a half, Mr. Mactavish resigned his position, because the salary paid him was altogether out of proportion to the work required of the Assistant Resident Master. Mr. Wm. Nattress took Mr. Mactavish's place, and J. P. McMurrich, B.A., was appointed about the middle of November to assist in the night work and take charge of the department of Horticulture. Hence the chief item of increase under the head of "Salaries and Wages."

MISCELLANEOUS ITEMS.

Progress during the Year.

Having spoken of the year's operations as a whole, and of each term separately under the three heads laid down at the outset, it may not be amiss to devote a few lines to stock-taking—to note the steps in advance, if any, during the past year.

So far as I can judge, we have held our own at every point, and are able to report progress under several heads. A Museum has been opened; large additions have been made to the Library; an Anemometer has been put up, and observations taken three times a day instead of twice, as formerly; pipes have been laid from the city water-works to the College; and a Professor of Horticulture has been appointed. So that in future the College, lawn, greenhouses, and farm-buildings will have an abundant supply of water at all times; the department of Horticulture will receive due attention; and, as shown by Professor Panton's report in the second part of this volume, the meteorological observations will be of practical value in settling climatic and kindred questions. On the whole, I think we are much better equipped for our work than we were a year ago; but, after all, we are utterly unable to meet the demands for instruction in Agriculture throughout the Province; and this leads me to repeat the substance of what I have several times urged from the public platform on the question of

Agriculture in our Public Schools.

1st. That the elementary principles of Agriculture should be taught in all our rural Public Schools.

2nd. That not more than two High Schools or Collegiate Institutes should be maintained in any county, and not more than one in each of the smaller counties in which there are no cities or large towns.

3rd. That the money now spent in supporting unnecessary, struggling, and rival High Schools in almost every county should be employed to establish and maintain an agricultural school in each of the thirteen agricultural districts of the Province, to be open during the fall and winter months, if not the whole year, for the purpose of giving farmers' sons, and others who intend to follow farming, instruction in geology and physical geography as related to agriculture; chemistry, agriculture, botany, forestry, and fruit culture; reading from agricultural books and papers, writing, spelling, and arithmetic; English grammar, literature, and composition, with special lectures on the characteristic points and management of the most important breeds of horses, cattle, sheep, and pigs.

Then our system of education would be complete, would make full provision for every class, and would not, as it now does, tend to draw our farmers' sons from the farm into the overcrowded trades and professions. For those who should decide to be farmers the full course would be the Public School, the District Agricultural School, and the Agricultural College; and for all others the Public School, the High School, and the University.

LIBRARY AND READING-ROOM.

We have a nice, cheerful Reading-room, and a commodious Library. The former is exactly suited to our wants; the latter is not quite large enough.

When the members of the Legislative Assembly visited us last winter they were so much impressed with our need of books that some of them brought the matter before the House a few days after, and the result was that over 3,000 volumes of choice reading were transferred from the library of the Education Office to the bare shelves of this institution. Since that time we have been able to boast of a very handsome library—not extensive, but well selected. It now contains 3,639 volumes of reports, herd-books, books of reference, and general reading.

We have also 42 papers and magazines on file in the Reading-room—six sent free by the kindness and generosity of the publishers, 31 furnished by the College, and five by the Literary Society.

Papers and Magazines.

(a) Sent Free.

<i>Journal of Commerce</i> (Montreal).	<i>Land Agents' Record</i> (England).
<i>Journal of Agriculture</i> (Montreal).	<i>Maritime Sentinel.</i>
<i>Canadian Entomologist</i> (London).	<i>Monthly Weather Review</i> (Toronto).—6.

(b) Furnished by the College.

<i>Daily Globe.</i>	<i>Scientific American.</i>
<i>Daily Mail.</i>	<i>Scientific American Supplement.</i>
<i>Weekly Globe.</i>	<i>Boston Journal of Chemistry.</i>
<i>Weekly Mail.</i>	<i>American Agriculturist.</i>
<i>Guelph Mercury.</i>	<i>Cultivator and Country Gentleman.</i>
<i>Guelph Herald.</i>	<i>Country Gentleman's Magazine.</i>
<i>Canadian Farmer and Grange Record.</i>	<i>Gardener's Monthly.</i>
<i>Farmer's Advocate.</i>	<i>Veterinarian.</i>
<i>Rural Canadian.</i>	<i>Veterinary Journal.</i>
<i>Canadian Monthly.</i>	<i>Aberdeen Free Press.</i>
<i>Grip.</i>	<i>Good Words.</i>
<i>Canadian Lumberman.</i>	<i>Sunday Magazine.</i>
<i>North British Agriculturist.</i>	<i>Quiver.</i>
<i>Irish Farmer's Gazette.</i>	<i>Sunday at Home.</i>
<i>Mark Lane Express.</i>	<i>Leisure Hour.</i> —31.
<i>National Live-Stock Journal.</i>	

(c) Furnished by the Literary Society.

<i>Canadian Illustrated News.</i>	<i>Harper's Weekly.</i>
<i>London Graphic.</i>	<i>Scientific News.</i> —5.
<i>Illustrated London News.</i>	

Books in Library.

	Vols.		Vols.
Agriculture	421	Meteorology	15
Botany	50	Mechanics	40
Biography	280	Miscellaneous	342
Chemistry	86	Magazines	726
Education	67	Poetry	112
Entomology	26	Religious	175
Encyclopædias	35	Reports	188
Fiction	125	Travels	125
General Science	150	Veterinary Science ..	66
Horticulture	88	Zoology	80
History	378		
Literature	50		
			3639

Rules and Regulations.

- 1. Students are particularly cautioned against the following offences :
 - (1) Loud conversation or other disturbance in the Reading-room.
 - (2) Marking, defacing, or in any other way damaging the walls, furniture, etc., of the Reading-room.
 - (3) Cutting from papers, magazines, etc.
- 2. Occupants of the Reading-room are specially requested to report the names of all persons found violating Rule No. 1.
- 3. Books may be obtained or exchanged any day (Sundays excepted) between 1 and 2 o'clock p.m.
- 4. No student is allowed to have more than one book from the Library at the same time.
- 5. No person shall retain a book longer than one week ; but he may retake any book, unless another has registered his name for it.
- 6. Students are responsible for books while their tickets are uncanceled.
- 7. All books must be returned to the Library on or before the last Saturday in each term.
- 8. Students who violate any of these rules are punishable by fine or suspension.

Form of Card deposited when a Book is taken out.

ONTARIO AGRICULTURAL COLLEGE LIBRARY.

No.	TITLE OF THE WORK.

Date.....188.....Signature.

Books Read in Four Months.

	July.	August.	October.	November.	Total.
Agriculture	22	25	102	130	279
Natural Science	5	6	56	95	162
Veterinary Science	4	9	19	45	77
English	11	10	37	49	107
Mathematics	2	1	..	9	12
Miscellaneous	62	90	16	140	308
	106	141	230	468	945

Museum.

The first effective effort for the establishment of a Museum in connection with the College was made some time last June. The large class-room, 50 feet long by 40 feet wide, in the south end of the main building, was set apart for the purpose. We spent no money on cases or furniture of any kind, but simply removed the old desks, and placed in the room a number of things which had been lying about, or packed out of sight for months—natural history specimens, varieties of wood, samples of grain, casts of animals, models of agricultural implements, a herbarium, and a large number of maps and charts.

of different kinds. We have made a beginning, and if the Government will only vote the money necessary to fit up the room and construct a gallery around it, the professors and students will do their best to make the collection a credit to the institution.

Gymnasium.

In my last Report I had the pleasure of referring to the fact that Captain McCrae, of Guelph, had presented the College with about \$200 worth of an outfit for a gymnasium, consisting of a horizontal bar, parallel bars, bar-bells, dumb-bells, Indian clubs, etc., etc. Since then we have added something to the list of articles, and Sergeant-Major Clarke, of the Wellington Field Battery, has given the young men regular and systematic training in all the less violent gymnastic exercises. Nothing in connection with the College is more thoroughly appreciated by the students; and I have to express my regret that the institution has not paid Mr. Clarke a dollar for his services during the last two years. I hope, therefore, that the small sum placed in my estimates for the year 1882 will be voted as a slight compensation to a very able and faithful instructor in a branch of education which no nation can afford to neglect.

Literary Society.

We have also a Literary Society in connection with the College, which meets every Friday evening, in one of the class-rooms, to practise declamation, read essays, and debate questions relating to agriculture, stock-raising, and other matters of special or general interest. The discussions are often quite spirited; and there is no doubt that the work done in the society is a valuable addition to the educational appliances of the institution. In the performance of such work the young men have an opportunity of measuring their strength and testing their armour before they set out in the warfare of life; they gradually learn to speak in public; their wits are sharpened, their reasoning powers developed, and their manners improved. The regular meetings of the Society are open to the members only; but once a year they give a literary and musical entertainment to their friends in Guelph. The only difficulty in connection with these entertainments and other public meetings at the College is that we have no room large enough to accommodate half of those who would like to come.

Salaries.

When making out my estimates under this head, I asked for an increase in two or three instances, and, in order to satisfy myself that I was justified in doing so, I wrote to Lansing, Michigan, for a statement of the salaries paid in the Michigan State Agricultural College. I received such a statement, and after looking it over, I could not help feeling that some of our officers have had reason to conclude that their work is not fully understood or appreciated. From that statement, as given below, you will see that the salaries paid in the Michigan Institution at the present time amount to \$20,443 a year; and all we ask from Ontario is \$12,100.

Total salaries paid in Michigan	\$20,443
Total salaries asked in Ontario	12,100
Difference	\$8,343
College salaries paid in Michigan	\$18,163
College salaries asked in Ontario	8,600
Difference	\$9,563

In regard to the Farm, I may say that we pay more attention to practical farming and experimenting than they do in Michigan, and hence the salaries under that head

amount to something more in Ontario than in Michigan ; but no one will venture to say that we make a mistake in giving greater prominence to that department of our work.

In Michigan, the boarding-house and dining-hall are managed by a steward and his wife ; and no member of the Staff is required to spend any portion of his evenings in looking after the students, the halls and the dormitories. In Ontario, no steward is employed. The President takes charge of the boarding-house, and is assisted by the Professor of Mathematics and the Professor of Horticulture in looking after the students in the halls and dormitories.

As might be expected, the night-work is a great bore to the professors above named, because it occupies their attention during the hours that other people have for rest, study or recreation ; and, this being so, their salaries should certainly not be less than what is paid to first-class masters in our High Schools. I do not ask such salaries as are paid in Michigan, where there is no night duty, but only \$1,000 and board for each. If my request be granted, the comparison will be as follows :

(1) Biology and Horticulture in Michigan Agricultural College	\$3,600
Biology, Horticulture and night duty in Ontario Agricultural College	1,000
(2) Mathematics in Michigan Agricultural College....	2,400
Mathematics, night duty, and charge of dining-hall in Ontario Agricultural College.....	1,000

In view of these facts, and others brought out in the following comparison, I think the salaries asked for our professors should be granted without modification.

MICHIGAN AGRICULTURAL COLLEGE, LANSING.

Salaries

(Paid at the present time).

(a) COLLEGE.

1. President, Professor of Mental Philosophy and Logic	\$3,000	
2. Professor of English Literature	1,800	
3. Professor of Chemistry	1,800	} \$2,600
4. Assistant in Chemistry	800	
5. Professor of Zoology and Entomology, and Curator of Museum	1,800	} \$3,600
6. Professor of Botany and Horticulture and Curator of Museum	1,800	
7. Professor of Mathematics and Civil Engineering	1,800	} \$2,400
8. Assistant in Mathematics	600	
9. Lectures in Agriculture.....	720	
10. Secretary ;	1,500	
11. Superintendent of Horticultural Department..	1,200	
12. Florist.....	743	
13. Steward in charge of boarding-house	600	
Total College Salaries	\$18,163	

(b) FARM.

1. Professor of Agriculture and Farm Superintendent	\$1,800
2. Farm Foreman	600
3. Vegetable Gardener	600
	<hr/>
	\$3,000
Less Lectures on Agriculture charged to College.....	720
	<hr/>
Total Farm Salaries	<u>\$2,280</u>

ONTARIO AGRICULTURAL COLLEGE, GUELPH.

Salaries

(Asked for 1882).

(a) COLLEGE.

1. President, and Professor of English Literature, who takes full charge of boarding-house	\$2,000
2. Professor of Chemistry, Geology and Meteorology, who acts as Librarian	1,500
3. Professor of Zoology, Entomology, Botany and Horticulture, who acts as Assistant Resident Master and Curator of Museum	1,000
4. Professor of Mathematics, who takes charge of dining-hall, and acts as Assistant Resident Master.....	1,000
5. Lectures on Agriculture and Arboriculture	800
6. Bursar and Storekeeper	800
7. Professor of Veterinary Science	1,000
8. Instructor in Drill and Gymnastics	150
9. Physician.....	400
	<hr/>
Total College Salaries asked	\$8,600

(b) FARM.

1. Professor of Agriculture and Farm Superintendent	\$2,000
2. Farm Foreman	600
3. Foreman of Horticultural Department.....	600
4. Foreman of Mechanical “	600
5. Superintendent of Experiments.....	500
	<hr/>
	\$4,300
Less Lectures on Agriculture charged to College.....	800
	<hr/>
Total Farm Salaries	<u>\$3,500</u>

College salaries in Michigan	\$18,163
Farm “ “	2,280
	<hr/>
Total.....	\$20,443

College salaries asked in Ontario	\$8,600
Farm " "	3,500
	<hr/>
	\$12,100
Cost of Professors' houses in Michigan.....	\$34,500
" " " Ontario	3,500

Engineer, assistants, messenger, servants and boarding-house expenses not included in either statement.

Wants.

The items under this head are so numerous, that I scarcely know where to begin. We require many things, but especially the following:—

- (1) A washing machine worked by steam in the laundry.
- (2) Three or four steam-kettles, and a new range in the kitchen.
- (3) A laboratory furnished with the apparatus necessary for making reliable analyses of soils, manures, and feeding-stuffs, and fitted up so that at least sixty young men could be simultaneously employed at practical work.

(4) Six Cottages—

One for the Farm Superintendent,
 " " Professor of Chemistry,
 " " Professor of Horticulture,
 " " Bursar,
 " " Farm Foreman,
 " " Gardener.

(5) New green and propagating houses, with a class-room, a botanical laboratory, and a botanical museum attached.

(6) The museum fitted up and furnished with suitable show-cases.

(7) A hall for public meetings.

I have spoken so often and so strongly about our need of a laboratory, that I shall not trouble you with a repetition of the periodical appeal, but refer you to Professor Panton's Report on his visit to the experimental stations at New Haven and New Brunswick, U.S. From it you will learn how far we are behind in this matter.

At an institution of this kind there are many duties which cannot be attended to within the hours that a man in any ordinary office is expected to work. It is always so in connection with a farm, and emphatically so where a farm and a college are managed together. Hence it is important that all our officers should reside on the premises; and for that reason I beg to recommend that the houses above referred to be built at once.

We have no propagating houses worthy of the name, and our greenhouses are altogether behind the times. They are not only too small, but the heating apparatus is so defective that many of the plants are stunted in growth, and some of the best are destroyed every winter with smoke. A portion of the Farm has been allotted to the Fruit-Growers' Association for the purpose of experimenting with fruit and forest trees, and a Professor has been appointed to take charge of the Department, and publish the results from year to year. Therefore, I beg to urge the necessity for building suitable green and propagating houses without delay.

I have the honour to be, Sir,

Your obedient Servant,

JAMES MILLS,
President.

R E P O R T
OF THE
PROFESSOR OF CHEMISTRY.

ONTARIO AGRICULTURAL COLLEGE,

GUELPH, *December 31st, 1881.*

To the President of Ontario Agricultural College:

DEAR SIR,—In accordance with your desire, I submit for your consideration a few observations made while on a visit this summer to the Agricultural Experiment Stations located at New Haven and New Brunswick, the former in the State of Connecticut, and the latter in New Jersey.

I also take this opportunity to make some suggestions in reference to the department over which I have the honour to preside.

The question of Agricultural Experiment Stations is one which has received a large amount of attention in Germany during the past twenty years. It is only since 1877 that such institutions have made their appearance in the United States.

The first established on this side the Atlantic is situate in New Haven, and well known as the Connecticut Agricultural Experiment Station.

It is not a matter of surprise that Connecticut has taken the lead in this work, when it is remembered that this is the home of Prof. Samuel Johnson, the distinguished Professor of Agricultural Chemistry in Yale College. As far back as 1867, Prof. Johnson had given to the public two books of great interest and wide circulation among students of agricultural science—"How Crops Grow," and "How Crops Feed." Since then, his name has always been associated with work which has had for its object the spread of scientific knowledge among farmers. The establishment of an Experiment Station at New Haven in 1877 may be considered as an outcome of his efforts on behalf of scientific agriculture.

The interesting Annual Reports of this Station, sent to us from time to time, and carefully read, led me to have a strong desire to visit New Haven during the College vacation this year, and make some inquiries regarding the work accomplished.

The work intended to be accomplished here is to analyze and test fertilizers, cattle-food, seeds, soils, waters, milk, and other agricultural materials and products; to identify grasses, weeds, useful and injurious insects, and to give information on the various subjects of agricultural science, for the use and advantage of the community. On the occasion of my visit I had the pleasure of meeting Dr. Jenkins, one of the chemists, who showed me every attention, and very kindly gave me whatever information I desired. Prof. Johnson, Director of the Station, was unfortunately absent at the time of my visit.

The chief work of the staff up to the present has been the analysis of fertilizers. In Connecticut a large quantity of artificial manures are used yearly. Before the establishment of this Station these were frequently adulterated, but since many exposures of fraud have been published in the bulletins of the Station, a higher grade of fertilizer is sold, and much has been done to check imposition on the farmers.

It is thought that less of this form of analysis will be required soon, and that the staff will be enabled to spend more time in the solution of problems connected with

agricultural science, and the work of the Station be more in harmony with that done at similar places in Germany. Some scientific investigations have been made, but by far the greater part of the time has been spent in making analyses of fertilizers, feeding-stuffs and soils.

The Experiment Station is a department by itself. None of the chemists do any teaching, their whole time being occupied in analytical work. The staff is as follows:

1. S. W. Johnson, M.A., Director, who, in addition to his salary as Professor of Agricultural Chemistry in Yale College, receives one thousand dollars annually.

2. E. H. Jenkins, Ph. D., Practical Chemist.

3. H. P. Armsby, Ph. D., " "

In addition to these, there are several assistants, who vary in number according to the work on hand. When it is considered how slowly the work of analysis proceeds, and the number required to be made here each year, it is not a matter of surprise that so many should be employed at this place. The following is a summary of the work done in 1880:

Analyses of Fertilizers	141
" Feeding-stuffs	17
" Waters	7
" Soils, etc.	20
" Miscellaneous	23
Total	208

In addition to this work, considerable time has been devoted to the study of methods for determining the quantity of certain constituents in fertilizers, etc.

The amount required to carry on the work during 1880 was about \$6,000, \$4,000 of which was expended in salaries, and \$1,100 in laboratory requirements. The continual increase of work, and the desire to further scientific investigation, has led the Director to urge strongly the necessity of increasing the grant for the enlargement of the laboratory outfit and the establishment of a working reference library.

The next place visited is known as the New Jersey Agricultural Experiment Station, located in New Brunswick, the site of the State Agricultural College.

This is comparatively new, only having been established last year, and modelled, in its workings, after that in Connecticut—although at the Agricultural College it is entirely separated from that institution.

The work so far has been much of the same character as that at New Haven, but the staff look forward to a time of more practical investigation.

It seems strange that so much analytical work is required in connection with fertilizers, but experience appears to show that the time spent and expense incurred have been well repaid by a great improvement in the quality of the fertilizers sold.

The staff here consists of—

1. G. H. Cook, LL.D., Director, Professor of Agriculture in Rutgers College.

2. A. T. Neale, Ph. D., Chemist; salary \$2,000.

3. Two Assistants.

4. A Secretary, whose whole time is occupied in work connected with the Station.

I had the pleasure of meeting Dr. Neale, who seems thoroughly wrapped up in his work, and sanguine in the success of the Station. He kindly gave every attention to my inquiries, and furnished me with much information concerning the work at which he is engaged. This place expects to enter, ere long, upon a thoroughly scientific series of experiments into the most economical methods of using fodders. I look forward with considerable interest to the coming Annual Reports of this Station.

At present a sum not exceeding five thousand dollars is yearly appropriated by the Legislature for the current expenses of this Station.

Both Stations, you will perceive, are entirely separated from the Agricultural Colleges where they are located. This separation seems to be essential to success, for where a chemist has much analytical work to do, his whole time is required for it—none

can be given to teaching, unless it be in showing students, occasionally, some of the operations performed in laboratory work. The more I learned about the working of these Stations from persons engaged at them, the more I became convinced that if ever an Agricultural Experiment Station is established at the Ontario Agricultural College, it will require to be a department in itself—entirely separated from the College. From what has been written as the results of my inquiries, you will be able to learn what staff is required, the current expenses and the nature of the work performed, at what may be appropriately called an Agricultural Experiment Station.

I shall now proceed to make some observations concerning the Chemical Department of the College here. Two great barriers present themselves to the accomplishment of practical work in this Department—want of accommodation, and a want of time.

Practical Chemistry cannot be taught successfully unless the students perform the operations themselves. Situated as we are here, this becomes almost impossible. Our laboratory—which is really the private room of the Professor of Veterinary Science—is capable of accommodating not more than six students at work, while in some cases one class may consist of forty to fifty. When this happens, the nearest approach to giving them instruction is to perform the manipulation while they look on. This is very unsatisfactory indeed, and more than once I have found, on asking a student to perform some practical work, he was at a complete loss how to proceed, although the work had been done before the class on several occasions, thus showing how necessary it is to use the hands as well as the eyes in the operations of Chemistry.

To overcome this difficulty, we require a laboratory capable of accommodating forty to fifty students at practical work. This, I believe, should be situated at a short distance from the main building, and provided with a lecture room, an apparatus room, a work room, general store room and a private room, besides the room for practical work.

Of the different Colleges which I have had the pleasure of visiting during the past three years, none appears to possess a laboratory so well adapted for the work of an institution like ours as that at Lansing. This is said to have cost twelve thousand dollars, but I am quite sure that a building equally commodious could be built here for a much less sum. With such a laboratory, the study of Chemical Science would become extremely popular, and our students would finish their course thoroughly equipped in knowledge which is becoming absolutely necessary for farmers to possess in order to keep abreast of the times. Many of the ablest papers on Agricultural Science, by such men as Lawes, Gilbert, Voelcker and Johnson, are not understood by a large majority on account of their ignorance of science.

Supplied with accommodation, another desideratum presents itself, viz., time.

There is a want of time at the disposal of the Professor of Chemistry, and also a want of time in the College course. You are aware that at present, during the College term, my duties require seventeen hours a week in the lecture-room—four days of three hours each, and one of five. With such a task weekly before me, there appears but little hope of my ever being able to work in the laboratory beyond arranging for coming lectures. Were the lectures upon one subject, the work would be to some extent lightened, but, instead of that, a course of lectures on Meteorology, Geology, Systematic Botany, Entomology and Chemistry, are required from the Professor of Chemistry. Besides all this, the general management of the library has fallen to my lot. It is not surprising, therefore, that I feel the work too much for the proper teaching of Chemistry, and that assistance will be required in the department of science. When a new laboratory is erected, I believe we should have another chemist added to our staff, whose principal duty would be practical work, such as making analyses of fertilizers, etc. There is ample work for two chemists in our College, one having his energies chiefly devoted to the teaching of chemistry, the other to practical work. Equipped with a commodious laboratory, and a chemist regularly employed in it, we would have facilities something like what we see in colleges of a similar nature in the States, and to some extent we would be able to do much of the work we see done at Agricultural Experiment Stations.

In reference to the Department of Chemistry, I firmly believe another year should be added to our course. It can never be expected that a student coming here for the

short period of two years can graduate an adept in chemical science, when universities thoroughly equipped demand a much more lengthened period.

The improvements which I would suggest for your consideration in connection with the Department of Science may be summed up as follows :

1. Improved accommodation.
2. Additional help.
3. A more extended course.

2. METEOROLOGY.

REPORT OF OBSERVATIONS TAKEN AT THE ONTARIO AGRICULTURAL COLLEGE DURING 1881.

During the past year the Meteorological Department of our College has received quite an addition to its instruments from the Magnetic Observatory at Toronto. Hitherto our observations have been of a somewhat imperfect nature, by being taken only twice a day instead of three times. This year I have endeavoured to have them taken in such a manner that they may become of ultimate service in questions pertaining to the climate of this locality.

Observations are regularly taken at the hours of 7 a.m., 2 p.m. and 9 p.m. daily. These are recorded in a book printed for the purpose, which we hope to keep carefully, and hand over to those who, in time to come, may succeed us in this work. We are now supplied with the following instruments :—

Anemometer—Recording the direction of the wind and indicating the number of miles travelled.

Barometer—Showing the atmospheric pressure at the time of observation.

Maximum thermometer—Indicating the highest temperature between stated intervals. This is read at 9 p.m.

Minimum thermometer—Indicating the lowest temperature between times of observation. This is also read at 9 p.m.

Hygrometer—With *dry* and *wet* bulb thermometers, for the purpose of showing the condition of the atmosphere with reference to moisture.

Pluviometer—Used in measuring the rainfall.

Thermometer—For observing ordinary temperature.

Besides taking observations from these instruments, the cloudiness of the sky is observed, and general remarks on the weather for the day are recorded in the daily register. Each morning a form, as seen below, is filled out and given for publication to the daily papers in Guelph. At the close of each month next year I purpose furnishing for publication a summary of the month's observations. From these monthly summaries a condensed statement of the year's meteorology will readily be made out. During the year there has been considerable difficulty experienced in carrying out arrangements concerning the observations, but at present the plan adopted is working satisfactorily.

In my course of lectures on Meteorology, the instruments named above are fully described, and the students taught not only how to read them, but also to epitomize the observations taken in such a way as to make them interesting and instructive.

At examinations in this subject several instruments are placed before the students, and a question always put is, "Read the instruments before you." The outline of the lectures is found in your syllabus of the course on Meteorology.

I have under consideration at present a series of experiments for the purpose of ascertaining some facts in reference to the temperature of different soils exposed to similar conditions. These I hope ere long to be enabled to carry out and embody in some future Report.

FORM OF RECORD PUBLISHED DAILY IN THE GUELPH PAPERS.

WEATHER RECORD.

ONTARIO AGRICULTURAL COLLEGE,
..... 1881.

Normal height of barometer at Guelph (1,100 feet above sea level and 740 above Lake Ontario), 28.86 inches. Average temperature for

Barometer { Height inches.
 { Change

Hygrometer Moisture

Anemometer .. { Direction of wind

 { Miles travelled during previous twenty-four hours

Minimum temperature during preceding twenty-four hours

Maximum " " " " "

Pluviometer—Rainfall inches.

FORM OF MONTHLY SUMMARY.

Meteorology.

A summary of the meteorological observations taken at Ontario Agricultural College during the month of

Barometer—

Highest barometer.

Lowest "

Highest mean barometer.

Lowest " "

Monthly " "

Monthly range.

Thermometer—

Highest thermometer.

Lowest "

Highest mean thermometer.

Lowest " "

Monthly " "

Monthly range.

Hygrometer—

Day of greatest humidity.

Day of least "

Mean "

Pluviometer—

Days rain fell.

Greatest rainfall.

Days snow fell.

Greatest snowfall.

Total precipitation.

Anemometer—

Direction of wind.

Greatest number of miles travelled in twenty-four hours.

 " velocity per hour.

Mean velocity per month.

Clouds—

Cloudy days.

Clear "

Mean cloudiness for the month.

The following is a summary of the observations taken during the year 1881 :—

January.

Atmospheric Pressure—

Highest barometer	.....	17th, 9 p.m.,	29.376 inches.
Lowest “	.....	13th, 2 “	28.288 “
Highest mean barometer	.....	17th,	29.226 “
Lowest “ “	.....	13th,	28.314 “
Monthly “ “	.....	.....	28.664 “
Monthly range	.....	.....	1.088 “

Temperature—

Highest temperature	.....	21st, 30°	
Lowest “	.....	18th, 10°	below zero.
Highest mean temperature	.....	21st, 21.6°	
Lowest “ “	.....	27th, 5.3°	
Monthly “ “	.....	.....	14.4°
Monthly range	.....	.....	40°

Rain—

Days rain fell	.....	1,	0.15 inches.
Day of largest rainfall	.....	1st,	0.15 “

Wind—

Direction	.....	N.	N.-W.	S.	S.-W.	S.-E.	N.-E.	E.	W.	
	.....	9	30	3	12	6	9	3	24	times.

This month was distinguished for cold, being one of the coldest in many years. Sleighing was good, and the month was almost free from rain. The middle was characterized by some very cold days, accompanied with dampness ; so much so, that horses travelling were completely covered with hoar frost.

Towards the close of the month the weather was beautiful, with excellent sleighing.

February.

Atmospheric Pressure—

Highest barometer	.....	15th, 7 a.m.,	29.148 inches.
Lowest “	.....	27th, 9 p.m.,	28.204 “
Highest mean barometer	.....	15th,	29.074 “
Lowest “ “	.....	28th,	28.276 “
Monthly “ “	.....	.....	28.904 “
Monthly range	.....	.....	0.944 “

Temperature—

Highest temperature	.....	11th, 41°	
Lowest “	.....	2nd, 16°	below zero.
Highest mean temperature	.....	11th, 36.3°	
Lowest “ “	.....	2nd, 8.3°	“
Monthly “ “	.....	.....	18.6°
Monthly range	.....	.....	57°

Rain—

Days rain fell	.....	4,	0.34 inches.
Greatest rainfall	.....	27th,	0.25 “

Wind—

Direction	.....	N.	N.-E.	N.-W.	S.	S.-E.	S.-W.	W.	E.	
	.....	..	4	40	4	16	20	12	4	times.

The temperature of this month was also below the average several degrees. The earlier part was particularly cold, but during the latter the weather became milder and rain fell.

*March.**Atmospheric Pressure—*

Highest barometer	15th, 7 a.m.,	28.022 inches.
Lowest “	20th, 9 p.m.,	28.116 “
Highest mean barometer.....	7th,	28.918 “
Lowest “ “	4th,	28.186 “
Monthly “ “ .....	.....	28.666 “
Monthly range .....	.....	0.906 “

Temperature—

Highest temperature	10th, 41°
Lowest “	12th, 8°
Highest mean temperature.....	14th, 35°
Lowest “ “	1st, 12.6°
Monthly “ “ .....	..... 25°
Monthly range .....	..... 33°

Rain—

Days rain fell	None.
Greatest rainfall	“

Wind—

Direction	N.	N.-W	N.-E.	S.	S.-W.	S.-E.	E.	W.
.....	15	60	10	5	5	5	2	10 times.

Considerable bright, clear weather occurred during this month. No rain fell, but several inches of snow (3rd very stormy.)

The latter part was characterized by windy weather.

*April.**Atmospheric Pressure—*

Highest barometer	23rd, 2 p.m.,	29.110 inches.
Lowest “	15th, 7 a.m.,	28.336 “
Highest mean barometer.....	23rd,	29.045 “
Lowest “ “	15th,	28.543 “
Monthly “ “ .....	.....	28.806 “
Monthly range .....	.....	0.774 “

Temperature—

Highest temperature	24th, 79.8°
Lowest “	2nd, 14.5°
Highest mean temperature.....	24th, 59.9°
Lowest “ “	4th, 22.1°
Monthly “ “ .....	..... 39.8°
Monthly range .....	..... 65.3°

Rain—

Days rain fell	2, 0.03 inches.
Greatest rainfall	1st, 0.02 “

Wind—

Direction	N.	N.-E.	N.-W.	S.	S.-E.	S.-W.	W.	E.
.....	8	6	18	4	5	3	10	6 times.

The early part of this month was somewhat cold and stormy, but the temperature became very high for this season of the year and reached the highest for years.

The rainfall was exceedingly small, and the snow passed away without the melting influence of April showers. At Toronto the rainfall was the smallest taken in any April since the establishment of the Observatory.

By the 19th ploughing had commenced on several farms in the neighbourhood.

*May.**Atmospheric Pressure—*

Highest barometer	.....	4th, 7 a.m.,	29.260 inches.
Lowest	"	14th, 9 p.m.,	28.502 "
Highest mean barometer	.....	3rd,	29.236 "
Lowest	"	14th,	28.698 "
Monthly	"	.....	28.584 "
Monthly range	.....	.....	0.758 "

Temperature—

Highest temperature	.....	28th,	89.6°
Lowest	"	.....	3rd, 31°
Highest mean temperature	.....	12th,	76.4°
Lowest	"	.....	3rd, 42.1°
Monthly	"	.....	56.4°
Monthly range	.....	.....	58.6°

Rain—

Days rain fell	.....	13,	1.36 inches.
Greatest rainfall	.....	15th,	0.52 "

Wind—

Direction	.....	N.	N.-E.	N.-W.	S.	S.-E.	S.-W.	W.	E.
	.....	6	21	16	13	9	9	3	15 times.

The mean temperature of this month was much above the average.

It commenced comparatively cool, but before the first week closed warm days appeared, and the temperature kept increasing until the fourth week, which was characterized by intense heat, the thermometer registering 89.6° in the shade.

The marked changes of temperature common to our climate at some seasons of the year are well illustrated in this month by comparing the 3rd (31°) with the 28th (89.6°).

*June.**Atmospheric Pressure—*

Highest barometer	.....	15th, 2 p.m.,	29.042 inches.
Lowest	"	3rd, "	28.494 "
Highest mean barometer	.....	15th,	29.248 "
Lowest	"	3rd,	28.536 "
Monthly	"	.....	28.772 "
Monthly range	.....	.....	0.548 "

Temperature—

Highest temperature	.....	18th,	81.5°
Lowest	"	.....	6th, 37.4°
Highest mean temperature	.....	28th,	69°
Lowest	"	.....	6th, 50°
Monthly	"	.....	58.4°
Monthly range	.....	.....	44.1°

Rain—

Days rain fell	.....	12,	2.85 inches.
Greatest rainfall	.....	28th,	1.01 "

Wind—

Direction	.....	N.	N.-E.	N.-W.	S.	S.-E.	S.-W.	W.	E.
	.....	8	23	22	4	7	7	10	9 times.

The weather during this month was more or less overcast, but the rainfall was below the average.

During the second week the wind was very high, reaching a velocity of fifty-nine miles per hour on the evening of the 13th.

*July.**Atmospheric Pressure—*

Highest barometer	15th, 2 p.m.,	29.604 inches.
Lowest "	20th, 9 a.m.,	28.596 "
Highest mean barometer	2nd,	29.204 "
Lowest " "	20th,	28.616 "
Monthly " " .....	.....	28.972 "
Monthly range .....	.....	1.008 "

Temperature—

Highest temperature	9th, 91.5°
Lowest "	1st, 52.4°
Highest mean temperature	5th, 79.5°
Lowest " "	27th, 62.8°
Monthly " " .....	.. 67.5°
Monthly range .....	.. 39.1°

Rain—

Days rain fell	8, 1.01 inches.
Greatest rainfall	8th, .58 "

Wind—

	N.	N.-E.	N.-W.	S.	S.-E.	S.-W.	W.	E.
Direction	10	7	18	10	9	10	12	6 times.

The first week of this month was intensely hot, but the temperature decreased during the middle and became much cooler towards the close. Though light showers occurred several times during the month, still the rainfall was much below the average of former years.

*August.**Atmospheric Pressure—*

Highest barometer	24th, 2 p.m.,	29.104 inches.
Lowest "	12th, 9 "	28.572 "
Highest mean barometer	24th,	29.150 "
Lowest " "	12th,	28.644 "
Monthly " " .....	.....	28.940 "
Monthly range .....	.....	.612 "

Temperature—

Highest temperature	30th, 97°
Lowest "	8th, 49°
Highest mean temperature	30th, 81°
Lowest " "	1st, 56.4°
Monthly " " .....	.. 72.7°
Monthly range .....	.. 48°

Rain—

Days rain fell	5, 2.15 inches.
Greatest rainfall	1st, .95 "

Wind—

	N.	N.-E.	N.-W.	S.	S.-E.	S.-W.	W.	E.
Direction	11	19	10	7	8	16	7	15 times.

The heat during the closing week of this month was intense. The rainfall was small compared with last year, when over 4 inches fell at Guelph. The weather was more or less sultry throughout the whole month, and it was almost impossible to work in the fields during the closing days.

*September.**Atmospheric Pressure—*

Highest barometer	17th, 9 p.m.,	29.106 inches.
Lowest "	27th, 2 "	28.738 "
Highest mean barometer	17th,	29.084 "
Lowest " "	2nd,	28.444 "
Monthly " "		28.808 "
Monthly range .....		.368 "

Temperature—

Highest temperature	6th, 98°
Lowest "	14th, 45°
Highest mean temperature	6th, 83.3°
Lowest " "	21st, 55.7°
Monthly " "	68.4°
Monthly range	53°

Rain—

Days rain fell	9, 1.07 inches.
Greatest rainfall	19th, .23 "

Wind—

	N.	N.-E.	N.-W.	S.	S.-E.	S.-W.	W.	E.
Direction	8	7	17	5	10	21	6	16 times.

This is the warmest September on record at the Toronto Observatory, the highest previous being in 1865, with a mean temperature 64.4°. Very little rain fell, while at Guelph last year the rainfall was 4.2 inches. The middle of the month was frequently overcast, accompanied by rain.

*October.**Atmospheric Pressure—*

Highest barometer	10th, 9 p.m.,	29.336 inches.
Lowest "	25th, 2 "	28.612 "
Highest mean temperature	20th,	29.268 "
Lowest " "	25th,	28.492 "
Monthly " "		28.985 "
Monthly range .....		.724 "

Temperature—

Highest temperature	3rd, 74.6°
Lowest "	27th, 28.8°
Highest mean temperature	3rd, 65.6°
Lowest " "	26th, 34°
Monthly " "	47.2°
Monthly range	45.8°

Rain—

Days rain fell	15, 4.81 inches.
Greatest rainfall	14th, 1.24 "

Wind—

	N.	N.-E.	N.-W.	S.	S.-E.	S.-W.	W.	E.
Direction	27	16	25	11	10	24	15	14 times.

Early part of the month was cloudy, and continued until the middle, when rain fell for the greater part of the remaining days. The temperature for the month was several degrees above the average, and the rainfall also exceeded that of former years.

November.

Atmospheric Pressure—

Highest barometer	10th, 7 a.m.,	29.345 inches.
Lowest	12th, 9 p.m.,	28.385 "
Highest mean temperature	10th, . . .	29.282 "
Lowest	12th, . . .	28.393 "
Monthly	. . . . .	28.805 "
Monthly range	. . . . .	.969 "

Temperature—

Highest temperature	8th,	66.3°
Lowest	28th,	9.4°
Highest mean temperature	8th,	53.8°
Lowest	22nd,	15°
Monthly	. . . . .	35.7°
Monthly range	. . . . .	56.9°

Rain—

Days rain fell	15,	2.53 inches.
Greatest rainfall	12th,	1.12 "

Wind—

	N.	N.-W.	S.	S.-W.	S.-E.	N.-E.	E.	W.
Direction	4	8	12	31	8	5	6	13 times.

Snow fell for the first time on the 4th, and but little was added during the month. A marked difference compared with November, 1880, when sleighing was thoroughly established by the 19th. Though half of the month was rainy, still a comparatively small amount (2.53 inches) fell. During the months October and November, the latter part of the week, especially Saturday, was characterized by disagreeable weather.

December.

Atmospheric Pressure—

Highest barometer	9th, 9 p.m.,	29.636 inches.
Lowest	31st, 7 a.m.,	28.178 "
Highest mean temperature	15th, . . .	29.247 "
Lowest	30th, . . .	28.238 "
Monthly	. . . . .	28.872 "
Monthly range	. . . . .	1.458 "

Temperature—

Highest temperature	16th,	76°
Lowest	31st,	8°
Highest mean temperature	13th,	47.6°
Lowest	31st,	19.2°
Monthly	. . . . .	31.9°
Monthly range	. . . . .	68°

Rain—

Days rain fell	10,	1.82 inches.
Greatest rainfall	22nd,	.48 "

Wind—

	N.	N.-W.	S.	S.-W.	S.-E.	N.-E.	E.	W.
Direction	5	17	13	32	..	14	..	3 times.

Cloudiness has been a characteristic of this month, which in some respects has been quite out of season. The thermometer seldom recorded much below freezing point until

the last day of the month, when the minimum thermometer at 9 p.m. indicated the temperature 8° below zero. This was the coldest day. Some very pleasant weather occurred during the second and third week. Rain fell for ten days, and the month closed without any snow on the ground. Much of the weather was more like what we see in October than the closing month of the year.

MEAN METEOROLOGICAL RESULTS FOR THE YEAR 1881.

	1881, Guelph.	Average of 40 years, Toronto.
<i>Barometer—</i>		
Mean pressure for the year	29.264	29.616
Month of highest mean pressure	November.	September.
Highest mean monthly	29.282	29.664
Lowest " "	28.186	29.572
Month of the lowest mean "	March.	June.
Date of the highest pressure in the year	Dec. 9th.	
Highest pressure	29.636	30.358
Date of the lowest pressure in the year	Dec. 31st.	
Lowest pressure	28.178	28.692
Range of the year	1.458	1.668
<i>Thermometer—</i>		
Mean temperature of the year	44.6	44.17°
Warmest month	August.	July.
Mean temperature of the warmest month	72.7	67.64
Coldest month	January.	February.
Mean temperature of the coldest month	14.4	22.73
Warmest day	Sept. 6th.	
Mean temperature of the warmest day	83.3	77.85
Coldest day	Feb. 2nd.	
Mean temperature of the coldest day	—8.3	—1.50
Date of highest temperature	Sept. 6th.	
Highest temperature	98°	91°
Date of lowest temperature	Feb. 2nd.	
Lowest temperature	—16°	—11.9°
Range of the year	114	102.0°
<i>Pluviometer—</i>		
Total depth of rain in inches	18.06	28.30
Number of days on which rain fell	94	110
Month in which the greatest depth of rain fell	October.	September.
Greatest depth of rain in one month	4.81 inches.	3.55
Month with most rainy days	October.	October.
Greatest number of rainy days in one month	15	13
Day in which the greatest amount of rain fell	Oct. 14th.	
Greatest amount of rain in one day	1.24	1.98

3. CATTLE FEEDING AND VALUATION OF FERTILIZERS.

As the feeding of cattle and the use of fertilizers are becoming every day of greater importance, I have thought it expedient to place in the hands of students of the Ontario Agricultural College some of the latest results of experiments in reference to the former, and a compilation of analyses which may enable them to pursue investigations in the feeding of cattle.

I have considered it advisable to add some remarks on the valuation of fertilizers, together with the analysis of the ash of plants, so as to enable thoughtful students to make a calculation as to the ingredients taken from the soil by certain plants.

Four things are thus to be considered—

- I.—Remarks on Cattle-feeding Experiments.
- II.—Analysis of Feeding-stuffs.
- III.—Valuation of Fertilizers.
- IV.—Analysis of the Ash of Plants.

These analyses have been compiled from the latest information on these subjects, and are printed for the use of students as a reference, so that the lecture hour may be spent in discussing principles, rather than giving a repetition of figures.

I.—REMARKS ON CATTLE-FEEDING EXPERIMENTS.

For years the Germans have been in the vanguard in search of scientific truth. They have spared neither trouble nor expense in following out investigations which have shed a flood of light upon many problems of intense interest to the farmer. Lawes and Gilbert of England, almost single-handed, have pushed into the unknown region and gathered much from the silent workings of nature. To these men the agriculturist of to-day owes a great deal for information on scientific agriculture. The Americans are awake to the importance of science in agriculture, and consequently have, and now are establishing Experiment Stations, much of the same nature as those in Germany, where some of the most intricate questions in agricultural science are investigated. Already the American stations have done good work, and a richer harvest is in the near future.

With a view to assist in understanding the results already obtained, I shall endeavour to express, as concisely as possible, some of the principles necessary to be understood before a proper use can be made of the facts discovered at those places of scientific investigation.

In the work of cattle-feeding more definite knowledge is required as to the reasons why this or that food or method of feeding is best suited for the purpose. This is the desire of every intelligent and thinking farmer, and to this end men of science and men of practice are uniting their forces, and year after year new light is being discovered in the hitherto dark regions of agricultural science.

Among the pioneers of scientific agriculture the name of Liebig, a German chemist, stands first. It is not many years since the first of his results were published. About the same time Boussingault laboured with distinguished success in France; while in England we find Lawes and Gilbert entering upon a course of investigation, the results of which will give their names a lasting place in books on agriculture. These men, Liebig, Boussingault, Lawes and Gilbert, have been the heralds of agricultural science, but now there are hundreds fired with the same enthusiasm as led them on when the world scoffed at their work, and each year gives us much of interest from the laboratories of Europe and America.

The most extensive and thorough experimenting in the feeding of animals has been done during the last fifteen years in the European and particularly in the German Agricultural Experiment Stations. The result of these stations seems to point out that a great loss is sustained by farmers from the haphazard way in which they generally feed their stock. Consequently the questions of *feeding standards, rations, etc.*, have become

of great interest and practical value. These I hope to make perfectly clear, so as to enable you to push the inquiry yourselves, and add data to the hundreds of experiments which have already been made.

Four classes of experiment have engaged the attention of the investigators at these Experiment Stations :

1.—*Practical Feeding Experiments.*

In carrying out experiments of this class, chemical analyses are made of the fodder given to the animals. The results have been of great value in deciding what are the most economical kinds, mixtures, and amounts of food for the different domestic animals, as horses, cattle, sheep and swine, according as the production of meat, milk, labour, etc., are required of them. The results do not inform us what proportions of the different foods are digested, nor how fat and flesh are formed in the animal body.

Experiments of this class can be carried on by any farmer who is ready to exercise care and accuracy in his observations.

2.—*Digestion Experiments.*

These are a higher type of experiment. In carrying them out an attempt is made to ascertain what proportions of the different foods are digested ; consequently not only the food, but also the excrement is measured, and its composition determined by chemical analysis.

Only a portion of the food consumed by an animal is digested ; the remainder passes from the body as excrement. The digestive part only is nutritious. From this is derived the flesh, fat, milk, etc.

If we would know the nutritive value of different foods, we must learn how much is really digestible.

To ascertain this the fodder is measured and analyzed, so that the percentage of each constituent is accurately known. The excrement is carefully collected, and likewise weighed and analyzed. By these means are ascertained how much of the different ingredients was contained in the food, and how much passed through the body undigested.

From the result of these experiments on digestion have been derived what are called "*digestion co-efficients.*" These represent what percentage of the several nutrients of any fodder is digestible. Take for example the following analysis of hay :—

Water	14.3
Ash	6.2
Protein	9.7
Crude fibre	26.3
Carbohydrates	41.0
Fat	2.5

The average of the experiments so far, gives the following proportion of the different nutrients digestible :—

Protein	56 per cent.
Crude Fibre	57 " "
Carbohydrates	63 " "
Fat	48 " "

These percentages are the so-called *digestion co-efficients*, consequently the amount of each ingredient multiplied by the corresponding *digestion co-efficient* gives the amount of digestible material in the hay ; e.g.:

Protein	$9.7 \times .56 = 5.4$	per cent. digestible Protein.
Crude Fibre	$26.3 \times .57 = 15.0$	" " Crude Fibre.
Carbohydrates	$41 \times .63 = 25.8$	" " Carbohydrates.
Fat	$2.5 \times .48 = 1.2$	" " Fat.

Until lately the *Crude Fibre* (sometimes called *Cellulose*), was often omitted from the calculation, because it was considered to be indigestible; but the results of recent experiments seem to show that in most cases it has quite a large percentage of digestible material. The digestible portion of this substance and the *Carbohydrates*, such as starch, sugar, gum, may be considered as of equal value, pound for pound; but *Fat* produces a greater effect on the body than an equal weight of *Carbohydrates*.

It was formerly believed that the *Carbohydrate* (sugar, starch, gum) served chiefly as fuel in the body to maintain the animal heat, and that since a pound of *Fat* yields $2\frac{1}{2}$ times as much heat when burned as a pound of starch, it was therefore $2\frac{1}{2}$ times as valuable a food, and hence, in calculating the nutritive power of food the *Fat* was reduced to its "*starch equivalent*" by multiplying it by $2\frac{1}{2}$. Later experiments seem to show that the *Carbohydrates* do more than generate heat, and that for the purposes of feeding, the factor $2\frac{1}{2}$ will be replaced by a more correct one. However, in most calculations, the $2\frac{1}{2}$ is still retained, and the various ingredients reduced to a common basis as follows:—

Digestible <i>Fat</i>	$1.2 \times 2\frac{1}{2} = 3$	.. "<i>Starch Equivalent.</i> "	
" <i>Fibre</i>	15	"	"
" <i>Carbohydrates</i>	25.8	"	"
Total		43.8	" "
" <i>Protein</i>	5.4	"	"

The above percentages are taken from the example already considered.

This 43.8, the whole reduced to its "*starch equivalent*," divided by the 5.4, digestible *Protein*, gives 8.1, which, compared with 1, is termed the "*nutritive ratio*," and is usually expressed as 1 : 8.1. In other words, "*nutritive ratio*" is a comparison between the *Albuminoids* and the *Carbohydrates*, in which the quantity of digestible *Albuminoid* is taken as unity.

3.—*Experiments on the Functions of the Food Ingredients.*

These have been undertaken to throw light on how the animal utilizes nutritious material.

Food is made up of starch, sugar, fibre, fat, gluten, fibrin and legumen. In order to understand how to use it most economically, we must know what part each ingredient plays in supplying an animal's wants, and from which the flesh and fat are derived, and how the food is transformed into the complex substances required in the animal economy. To do this it is necessary to learn what the food contained originally, and what are all the final products of its transformation in the body, and also to what use they have been applied in the body.

In carrying out experiments of this class, the food, excrement, solid and liquid, are measured and analyzed. Experiment has shown that the nitrogen in the urine comes from the transformation of *Albuminoids* in the body, and that the amount of nitrogen in the urine is a measure of the amount of transformation of these substances. If, therefore, by comparisons made from day to day, the amount of nitrogen in the urine is found to be less than that of the food digested, it is safe to infer that the lacking portion has been retained in the body; but, if it is more than was digested from the food, it is consistent to infer that the store of flesh in the body is decreasing. By such means the effects of different food materials in the formation of flesh in the body are determined.

4.—*Experiments on the Formation of Animal Heat and Muscular Force.*

These are the most complicated series of experiments of all, and involve the solution of some of the most complex problems in feeding. In their solution the measurement and analysis, not only of the food but also of the final products of its use in the body, are required. It is necessary to learn the amount and composition of the solid and liquid excrement and the gaseous compounds given off through the skin and lungs as well. The air must be analyzed both before and after the animal breathes it.

It is readily seen that experiments of this class are extremely laborious and complicated, and exceedingly difficult to carry out.

The majority of the experiments of the last three classes have been made during the last ten years, and it is only quite recently that apparatus has been constructed successfully for their investigation. Even already, though the field of investigation has been but little explored, the practical results have proved exceedingly useful and of high theoretical value.

As an outcome of these experiments, we have what are called "*feeding standards*." These are statements of the amount of digestible *protein*, *carbohydrates* and *fat* required for specific purposes, such as feeding for maintenance, feeding for fattening, feeding for work, feeding for the production of milk, and feeding for growing animals.

The scientific feeding of stock is not, properly speaking, a matter of so much hay, grain and roots, but rather of so much water, starch, sugar, gluten, etc., of which they are composed.

To use fodder economically, it is necessary to so mix and deal it out that the ration shall contain just the amounts of the various ingredients needed for maintenance or production, as required.

To do this successfully, four things are required :

1. A knowledge of the chemical composition of the fodder used ; in other words, the amount of albuminoids, sugar, starch, fat, water, etc., it contains.

2. It is necessary to know the proportion of these ingredients which are digestible, and how the different kinds of fodder must be mixed and fed, so that this digestible material shall be most fully digested and utilized and the least quantity wasted.

3. We must know what part each of these food ingredients plays in the animal economy, which are the "*flesh formers*" and the "*fat formers*," and from which heat and force are derived.

4. A knowledge of the quantity required by animals for maintenance, fattening, working, production of milk, and growth is also necessary. If these principles were well understood and followed, much waste of food would be prevented. It is with this object that the whole question of *feeding standards* is at present occupying the closest attention of many Experiment Stations in Germany. Suppose, for instance, that a farmer knew how much of the different food ingredients a cow requires to keep her in good condition, and at the same time to enable her to give a full yield of milk, how much of albuminoids, starch, fat, etc., she will use economically, and how much of these nutritive substances is contained in a hundredweight of turnips or hay. He could calculate very easily what proportion of these food materials he would require to mix together in order to make up an appropriate ration for a cow.

All our feeding stuffs are made up of *water*, *mineral matter*, and *organic substance*. This *organic substance* supplies two classes of ingredients, one containing nitrogen, *albumen*, *gluten*, *legumen*, *fibrin*, etc., usually called Albuminoids ; the other containing no nitrogen, *sugar*, *starch*, *gum*, *fibre* and *fat*.

When properly mixed, nearly all the organic substance of the roots, fruits and cereal grains is digested. It will be seen at once how important it is to know more about the principles of *feeding standards* and *rations*.

The following are some conclusions derived from carefully made experiments in feeding :

1. Much of the crude fibre (*cellulose*) is digested, even as high as fifty per cent. This substance was formerly considered to pass through the system undigested. Crude fibre thus becomes of importance in feeding cattle.

2. Animals digest about the same percentage of a large ration as a small ; that is, they will digest no greater proportion of a scanty allowance than of a large one.

3. That the same varieties of fodder varies in indigestibility according to conditions surrounding it during growth. Grasses raised on well-manured land are generally richer in nitrogen than when grown with less manure.

4. After blossoming, plants deteriorate in nutritive value. The older the plant, the less digestible and less rich in nitrogen. Thus it is, much of the nutritive value of

forage crops, as hay, clover, etc., is lost by allowing them to become too ripe before harvesting.

A proper knowledge of the laws relating to the digestion of food should engage the attention of every farmer, so as to enable him to economize the food he has. As a general rule, concentrated foods, such as grain, oil-cake, etc., containing not over seven or eight pounds of digestive albuminoids to one pound of digestible carbohydrates, may be fed with hay and clover without loss to the digestion of the latter. From this it can easily be understood how straw, chaff, corn-stalks, etc., may be of great value in a food mixture, for these are rich in *non-nitrogenous*, but poor in *nitrogenous* nutritive material.

They become a valuable source of fodder when mixed and fed so as to secure the utilization of the digestive material which they contain.

Consequently, to economize these materials it is necessary to mix them with others rich in nitrogen, as pea-meal, oil-cake, etc.

The albuminoids have a large share in the work of nutrition. From these are derived the nitrogenous parts of the body, including the muscle, as well as the casein and albumen of the milk.

The fat in the body and that of the milk seems to be also formed in a large part from *Albuminoids*, and it is highly probable that they even contribute by their consumption to the production of muscular force. This being the case, it is manifest that the production of meat, milk, and work must require the use of large amounts of *Albuminoids* in the food.

From a series of experiments made to ascertain what amounts of *Albuminoids* and *Carbohydrates* are required for the maintenance of animals in a fair condition, it has been inferred that a daily ration for maintenance of an ox (1,000 lbs.), should contain .7 lbs. digestible *Albuminoids* and 8½ lbs. digestible *Carbohydrates*; that is, a nutritive ratio of 1 : 12¼. This ratio, you will remember, is obtained by dividing the number which represents the *Albuminoids* into that of the *Carbohydrates*.

The ration for a milch cow (1,000 lbs.) is put at 2.5 lbs. digestible *Albuminoids*, 12½ lbs. *Carbohydrates* and .4 lbs. *Fat* in 24 lbs. dry organic matter.

This gives a nutritive ratio of 1 : 5.4, thus :

$$\begin{array}{rcl} .4 \times 2\frac{1}{2} = & 1.00 & \text{.. "Starch Equivalent" or equivalent carbohydrate.} \\ 12.5 & \text{.. The Carbohydrates (starch, sugar, etc.).} \\ \hline & 13.5. & \end{array}$$

$$\text{This } 13.5 \div 2.5 = 5.4.$$

While these figures hold good in many cases, yet it must be remembered that a general rule cannot be laid down for all animals, because the composition of the plant is affected by manure, weather, and very much by how it was harvested and what condition it was in at the time of harvesting. The nature of the animal, too, has an effect. But there is no doubt that the principle of *nutritive ratios* in feeding indicates the pathway to economy in using fodder, and that to a thoughtful person supplies principles by the application of which the largest amount of profit can be derived from the food at his disposal.

The conclusion to be drawn from the facts obtained in reference to the nutritive power of fodder seems to be that our common fodder materials are apt to contain less nitrogenous material than is needed for the most profitable results.

Only the best quality of hay is sufficiently rich in nitrogen. Turnips, mangolds, potatoes, and roots generally contain, relatively, less *Albuminoids* and more *Carbohydrates* than suitable for production. We have two sources for supply of nitrogenous foods.

(1.) Cultivation of plants rich in nitrogen, such as peas, clover, beans, lucerne, and other leguminous plants.

(2.) The use of oil-cake, etc.

We shall now consider the plan followed in making up a *ration* which shall contain the quantities of digestible nutrients required by a *feeding standard*; e. g., the *feeding*

standard for milk, already referred to, is in the case of a cow weighing 1,000 lbs., as follows :

Digestible Protein	2.5 pounds.
“ Fat . . . . .	.4 “
“ Carbohydrate	12.5 “

This is a nutritive ratio 1 : 5.4, and should be found in food containing 24 pounds of dry organic substance.

To make up the ration which shall supply the requirements of this *standard*, we examine the tables for the analyses of the food to be used and the percentage of these foods that are digestible, and so arrange the mixture that the sum of the organic substances is equal to 24 pounds, and the proportion of albuminoids to carbohydrates as 1 : 5.4.

You will remember the *Fat* is reduced to equivalent *Carbohydrates* by multiplying by 2½.

Accurate analyses cannot be given in fixed tables, but a very good approximation is supplied in the tables added. An exact correspondence with the *standard* need not be expected. *Feeding standards* are not to be considered as fixed rules, but more as guides, which must be intelligently adapted to individual circumstances.

Three points require special consideration in making up a *ration* :

- (1.) The animal—age, nature, condition, and what is required of it—maintenance, work, fat, milk, or growth.
- (2.) Surrounding conditions—warmth, etc.
- (3.) The food—condition when harvested, the soil from which it was obtained, etc.

The following, obtained from the result of many experiments in cattle-feeding, are some of the *feeding standards* which have been adopted with success.

The calculations are daily *rations* for animals of 1,000 pounds live weight, in each case.

FEEDING STANDARDS (WOLFF).

A.—PER DAY AND PER 1,000 LBS. LIVE WEIGHT.

	Total Organic Substance.	Nutritive (digestible) Substances.			Total Nutritive Substance.	Nutritive Ratio.
		Albumi- noids.	Carbo- hy- drates.	Fat.		
	lbs.	lbs.	lbs.	lbs.	lbs.	
1. Oxen at rest in stall.....	17.5	0.7	8.0	0.15	8.25	1 : 12.
2. Wool sheep, coarser breeds..	20.0	1.2	10.3	0.20	11.70	1 : 9.
“ “ finer breeds....	22.5	1.5	11.4	0.25	13.15	1 : 8.
3. Oxen moderately worked...	24.0	1.6	11.3	0.30	13.20	1 : 7.5
“ heavily worked.....	26.0	2.4	13.2	0.50	16.10	1 : 6.
4. Horses moderately worked..	22.5	1.8	11.2	0.60	13.60	1 : 7.
“ heavily worked	25.5	2.8	13.4	0.80	17.00	1 : 5.5
5. Milk cows	24.0	2.5	12.5	0.40	15.40	1 : 5.4
6. Fattening oxen, 1st period..	27.0	2.5	15.0	0.50	18.00	1 : 6.5
“ “ 2nd “	26.0	3.0	14.8	0.70	18.50	1 : 5.5
“ “ 3rd “	25.0	2.7	14.8	0.60	18.10	1 : 6.0
7. Fattening sheep, 1st period.	26.0	3.0	15.2	0.50	18.70	1 : 5.5
“ “ 2nd “	25.0	3.5	14.4	0.60	18.50	1 : 4.5
8. Fattening swine, 1st period.	36.0	5.0	27.5		32.50	1 : 5.5
“ “ 2nd “	31.0	4.0	24.0		28.00	1 : 6.0
“ “ 3rd “	23.5	2.7	17.5		20.20	1 : 6.5

FEEDING STANDARDS—*Continued.*

	Total Organic Substance.	Nutritive (digestible) Substances.			Total Nutritive Substance.	Nutritive Ratio.
		Albumi- noids.	Carbo- hydrates.	Fat.		
9. Growing cattle :						
Age, months.	lbs.	lbs.	lbs.	lbs.	lbs.	
2—3	22.0	4.0	13.8	2.0	19.8	1 : 4.7
3—6	23.4	3.2	13.5	1.0	17.7	1 : 5.0
6—12	24.0	2.5	13.5	0.6	16.6	1 : 6.0
12—18	24.0	2.0	13.0	0.4	15.4	1 : 7.0
18—24	24.0	1.6	12.0	0.4	13.9	1 : 8.0
10. Growing sheep :						
5—6	28.0	3.2	15.6	0.8	19.6	1 : 5.5
6—8	25.0	2.7	13.3	0.6	16.6	1 : 5.5
8—11	23.0	2.1	11.4	0.5	14.0	1 : 6.0
11—15	22.5	1.7	10.9	0.4	13.0	1 : 7.0
15—20	22.0	1.4	10.4	0.3	12.1	1 : 8.0
11. Growing fat pigs :						
2—3	42.0	7.5	30.0		37.5	1 : 4.0
3—5	34.0	5.0	25.0		30.0	1 : 5.0
5—6	31.5	4.3	23.7		28.0	1 : 5.5
6—8	27.0	3.4	20.4		23.8	1 : 6.0
8—12	21.0	2.5	16.2		18.7	1 : 6.5

B.—PER DAY AND PER HEAD.

	Total Organic Substance.	Nutritive (digestible) Substances.			Total Nutritive Substances.	Nutritive Ratio.
		Albumi- noids.	Carbo- hydrates.	Fat.		
Growing cattle :						
Age, months.	lbs.	lbs.	lbs.	lbs.	lbs.	
2—3 150 lbs.	3.3	0.6	2.1	0.30	3.00	1 : 4.7
3—6 300 "	7.0	1.0	4.1	0.30	5.40	1 : 5.0
6—12 500 "	12.0	1.5	6.8	0.30	8.40	1 : 6.0
12—18 700 "	16.8	1.4	9.1	0.28	10.78	1 : 7.0
18—24 850 "	20.4	1.4	10.3	0.26	11.96	1 : 8.0
Growing sheep :						
5—6 56 lbs.	1.6	0.18	0.87	0.045	1.095	1 : 5.5
6—8 67 "	1.7	0.17	0.85	0.040	1.060	1 : 5.5
8—11 75 "	1.7	0.16	0.85	0.037	1.047	1 : 6.0
11—15 82 "	1.8	0.14	0.89	0.032	1.062	1 : 7.0
15—20 85 "	1.9	0.12	0.88	0.025	1.047	1 : 8.0
Growing fat swine :						
2—3 50 lbs.	2.1	0.38	1.50		1.88	1 : 4.0
3—5 100 "	3.4	0.50	2.50		3.00	1 : 5.0
5—6 125 "	3.9	0.54	2.96		3.50	1 : 5.5
6—8 170 "	4.6	0.58	3.47		4.05	1 : 6.0
8—12 250 "	5.2	0.62	4.02		4.67	1 : 6.0

The term "total organic substance" is applied to the amount of the substance fed, less the water and ash. The difference between total organic substance and "total nutritive substance" expresses the quantity of indigestible material.

Another way of representing the food to be given for specific purposes is by expressing it in the form of *daily rations* per 1,000 pounds live weight, made up of so many pounds of feeding-stuffs, and calculated to contain nutritive materials in the proportions given above.

A.—DAILY RATIONS FOR MAINTENANCE FODDER FOR FULL-GROWN OXEN.

lbs. (1). 1½ Clover hay.	lbs. (2). 3 Clover hay.	lbs. (3). 10 Barley straw.	lbs. (4). 5 Timothy.
13 Barley straw.	13 Oat straw.	5 Wheat chaff.	7 Oat straw.
25 Mangolds.	20 Mangolds.	25 Mangolds.	5 Wheat chaff.
½ Rape cake.		½ Rape cake.	5 Potatoes.

B.—MILK COWS.

lbs. (1). 12 Timothy.	lbs. (2). 10 Clover hay.	lbs. (3). 6 Timothy.
11 Barley straw.	10 Barley straw.	8 Clover.
15 Potatoes.	23 Potatoes.	10 Oat straw.
3 Rape cake.	3 Wheat bran.	16 Potatoes.
		1½ Rape cake.

C.—FATTENING CATTLE.

lbs. (1). 7 Timothy.	lbs. (2). 6 Clover.
6 Wheat straw.	7 Barley straw.
62 Mangolds.	70 Mangolds.
4 Bean meal.	2 Linseed.
2 Linseed.	3 Bean meal.
2½ Rye bran.	2 Unbolted rye.

The foregoing tables are given in explanation of the scientific principles involved in cattle-feeding. Other systems are followed which differ from these standards, but these are the results of many years' arduous labour by German investigators, during which thousands of analyses and hundreds of laborious feeding trials have been made.

I will now proceed to give the analyses of the principal feeding-stuffs in use. From a consideration of these, it is expected that the application of the principles already discussed will be readily made.

In the analysis of a feeding-stuff six ingredients are usually sought :

1. *Water.*

2. *Ash.*

3. *Crude fibre* (cellulose).

4. *Albuminoids*—substances rich in nitrogen and sometimes called *flesh formers*. Albumen, gluten, casein, legumen, fibrin, belong to this group.

5. *Carbohydrates*—substances with no nitrogen, and with the hydrogen and oxygen in the same proportions as we find them in water, viz.: twice as much of the former as the latter. Sugar, starch, gum, etc., belong here.

6. *Fats or oils* also contain no nitrogen. In these the oxygen and hydrogen are not in the proportions in which they occur in water: the hydrogen being in excess.

II.—ANALYSIS OF FEEDING STUFFS.

A Table showing the Average Composition of various kinds of Food.

VARIETY OF FOOD ONE HUNDRED POUNDS CONTAINS.	Inorganic substance.		Organic substance.				Digestible organic sub- stance con- sists of.		Indigestible organic sub- stance.		Digestible organic sub- stance.		Ratio of digestible Albu- minoids to digestible Car- bohydrates.	
	Water.	Ash.	Albuminoids.	Crude fibre.	Carbohydrates.	Fat.	Indigestible organic sub- stance.	Digestible organic sub- stance.	Albuminoids.	Carbohydrates.	Fat.	Ratio of digestible Albu- minoids to digestible Car- bohydrates.		
HAY.														
Meadow hay, poor.....	19.3	14.3	5.0	80.7	7.5	33.5	38.2	1.5	41.9	38.8	3.4	34.9	.5	1:10.6
“ “ average.....	20.5	14.3	6.2	79.5	9.7	26.3	41.6	2.3	32.1	47.4	5.4	41.1	.9	1:7.9
“ “ good.....	22.	15.0	7.0	78.0	11.7	21.9	42.3	2.2	27.5	50.5	7.4	42.1	1.0	1:6.0
Red clover, poor.....	20.1	15.0	5.1	79.9	11.1	28.9	37.7	2.1	35.3	44.6	5.7	37.9	1.0	1:7.1
“ “ average.....	21.3	16.0	5.3	78.7	12.3	26.0	38.2	2.2	32.4	66.3	7.0	38.1	1.2	1:5.9
“ “ good.....	22.5	16.5	6.0	77.5	13.5	24.0	37.1	2.9	29.1	48.4	8.5	38.2	1.7	1:5.0
White clover, average.....	22.5	16.5	6.0	77.5	14.5	25.6	33.9	3.5	31.5	46.0	8.1	35.9	2.0	1:5.0
Lucerne, average.....	22.2	16.0	6.2	77.8	14.4	33.0	27.9	2.5	39.1	38.7	9.4	28.3	1.0	1:3.3
“ “ good.....	23.3	16.5	6.8	76.7	16.0	26.6	31.8	2.3	32.1	44.6	12.3	31.4	.9	1:2.7
Sainfoin, average.....	22.9	16.7	6.2	77.1	13.3	27.1	34.2	2.5	32.3	44.8	7.6	35.8	1.4	1:5.2
Alsike clover, average.....	22.	16.0	6.0	78.0	15.0	27.0	32.7	3.3	32.8	45.2	8.6	34.8	1.8	1:4.6
Yellow “ “.....	22.1	16.7	6.0	77.3	14.6	26.2	33.2	3.3	29.7	47.6	9.2	36.4	2.0	1:4.5
Bokhara “ “.....	23.2	14.3	8.0	77.7	16.7	30.3	27.9	2.8	34.9	42.8	8.5	31.7	1.6	1:4.2
Vetches, in flower.....	25.	16.7	8.3	75.0	14.2	25.5	32.8	2.5	21.6	43.4	9.4	32.5	1.5	1:3.9
Peas, in flower.....	23.7	16.7	7.0	76.3	14.3	25.2	34.2	2.6	32.2	44.1	9.4	33.1	1.6	1:4.0
Timothy grass, flowering.....	18.8	14.3	4.5	81.2	9.7	22.7	45.8	3.0	30.6	50.6	5.8	43.4	1.4	1:8.1
Italian rye-grass, “.....	22.1	14.3	7.8	77.9	11.2	22.9	40.6	3.2	27.9	50.0	7.1	41.5	1.4	1:6.3
Perennial “ “.....	20.8	14.3	6.5	79.2	10.2	30.2	36.1	2.7	38.0	41.2	5.1	35.3	.8	1:7.3
Millet, flowering.....	19.1	13.4	5.7	80.9	10.8	29.4	38.5	2.2	32.9	48.0	6.1	41.0	.9	1:7.1
STRAW.														
Wheat.....	18.9	14.3	4.6	81.1	3.0	44.0	32.6	1.5	48.0	33.1	.8	31.9	.4	1:41.1
Barley.....	18.4	14.3	4.1	81.6	4.0	40.0	36.2	1.4	42.9	38.7	1.4	36.9	.4	1:27.1
Oat.....	18.3	14.3	4.0	81.7	3.5	42.0	34.2	2.0	42.4	39.3	1.3	37.4	.6	1:29.9
Rye.....	18.4	14.3	4.1	81.6	2.5	48.0	29.8	1.3	47.7	33.9	.7	32.8	.4	1:48.3
Vetch.....	20.5	16.0	4.5	79.5	7.5	42.0	29.0	1.0	43.7	35.8	3.4	31.9	.5	1:9.8
Pea.....	22.5	16.0	4.5	79.5	6.5	38.0	34.0	1.0	42.7	36.8	2.9	33.4	.5	1:12
Seed clover.....	21.6	16.0	5.6	78.4	9.4	42.0	25.0	2.0	44.7	33.7	4.2	28.5	1.0	1:7.4
Cornstalk.....	19.2	15.0	4.2	80.8	3.0	40.0	36.7	1.1	42.4	38.4	1.1	37.0	.3	1:34.4
CHAFF AND COBS.														
Wheat.....	26.3	14.3	9.2	73.7	4.5	36.0	35.6	1.4	39.1	34.6	1.4	32.8	.4	1:24.1
Oat.....	24.3	14.3	10.9	75.7	4.0	34.0	36.2	1.5	36.9	38.8	1.6	36.6	.6	1:23.8
Rye.....	21.8	14.3	7.5	78.2	3.6	43.5	29.9	1.2	41.8	36.4	1.1	34.9	.4	1:32.6
Barley.....	27.3	14.3	10.0	72.7	3.0	30.0	38.2	1.5	35.9	36.8	1.2	35.0	.6	1:30.4
Pea.....	21.	15.0	6.0	79.0	8.1	32.0	36.9	2.0	37.6	41.4	4.0	36.2	1.2	1:9.8
Beans.....	20.5	15.0	5.5	79.5	10.5	33.0	34.0	2.0	38.5	41.0	5.1	34.7	1.2	1:7.4
Corn cobs.....	16.8	14.0	2.8	83.2	1.4	37.8	42.6	1.4	40.5	42.7	.6	41.7	.4	1:71.2
GREEN FODDER.														
Pasture grass.....	82.0	80.0	2.0	18.0	3.5	4.5	9.2	.8	5.3	12.7	2.4	9.9	.4	1:4.5
Italian rye-grass, flowering.....	76.2	73.4	2.8	23.8	3.6	7.1	12.1	1.0	8.5	15.3	2.3	12.6	.4	1:5.9
Perennial, “.....	72.	70.0	2.0	28.0	3.6	10.6	12.8	1.0	13.7	14.3	1.8	12.2	.3	1:7.2
Timothy, “.....	72.1	70.0	2.1	27.9	3.4	10.1	13.4	1.0	11.3	16.6	1.9	14.2	.5	1:8.1
Green rye, “.....	71.6	76.0	1.6	22.4	3.3	7.9	10.4	.8	9.1	13.3	1.9	11.0	.4	1:6.3
Green oats, “.....	82.4	81.0	1.4	17.6	2.3	6.5	8.3	.5	7.2	10.4	1.3	8.9	.2	1:7.2
Oats and vetches mixed, flowering.....	85.4	84.0	1.4	14.6	2.4	5.4	6.4	.4	6.1	8.5	1.4	5.9	.2	1:5.4
Sorghum saccharatum, “.....	83.3	82.2	1.1	16.7	1.2	4.7	10.3	.5	5.8	10.9	.8	9.0	.2	1:9
Indian corn, “.....	78.4	77.3	1.1	21.6	2.5	6.7	11.7	.7	7.9	13.7	1.6	11.9	.3	1:7.4

ANALYSIS OF FEEDING STUFFS—Continued.

VARIETY OF FOOD ONE HUNDRED POUNDS CONTAINS.	Inorganic substance.		Ash.	Organic substance.		Albuminoids.	Crude-fibre.	Carbohydrates.	Fat.	Indigestible organic substance.	Digestible organic substance.	Digestible organic substance consists of.		Ratio of digestible Albuminoids to indigestible Carbohydrates.
	Water.											Albuminoids.	Carbohydrates.		Fat.
GREEN FODDER.														
Millet, flowering	71.9	70.0	1.9	28.1	3.7	10.2	13.4	.8	11.5	16.6	2.1	14.2	.3	1:7.1
Red clover, before flowering ..	84.3	83.0	1.5	15.5	3.3	4.5	7.0	.7	5.3	10.2	2.3	7.4	.5	1:3.8
White clover, in flower	82.5	80.5	2.0	17.5	3.5	6.0	7.2	.8	6.9	10.6	2.2	7.9	.5	1:4.2
Alsike clover, in blossom	86.5	86.0	1.5	13.5	3.3	4.5	5.1	.6	5.2	8.3	2.1	5.8	.4	1:3.2
Lucerne, young	82.7	81.0	1.7	17.3	4.5	5.0	7.2	.6	6.2	11.1	3.5	7.3	.3	1:2.3
Sainfoin, in flower	81.5	80.0	1.5	18.5	3.2	6.5	8.2	.6	8.1	10.4	2.1	8.0	.3	1:4.1
Bokhara clover, in flower	89.6	87.5	2.1	10.4	2.9	3.6	3.5	.4	4.7	5.7	1.6	3.9	.2	1:2.7
Vetches, "	83.8	82.0	1.8	16.2	3.5	5.5	6.6	.6	6.7	9.5	2.5	6.7	.3	1:3.0
Peas, "	83.0	81.5	1.5	17.0	3.2	5.6	7.6	.6	7.1	9.9	2.2	7.4	.3	1:3.7
Young thistles	88.7	86.7	2.0	11.3	2.8	1.4	6.1	.9	2.5	8.8	2.2	6.0	.6	1:3.4
Carrot leaves	85.6	82.0	3.6	14.2	3.2	3.0	7.2	1.0	4.5	9.7	2.2	7.0	.5	1:3.8
Mangold "	92.3	90.5	1.8	7.7	2.9	1.3	4.0	.5	2.3	5.4	1.2	4.0	.2	1:3.7
Turnip "	90.7	88.4	2.3	9.3	2.1	1.6	5.2	.5	2.4	6.9	1.5	5.1	.3	1:3.9
ROOTS AND TUBERS.														
Potatoes, good	75.9	75.0	.9	24.1	2.1	1.1	20.6	.3	1.1	23.0	2.1	20.6	.3	1:10.2
Mangolds, "	88.8	88.9	.8	12.2	1.1	.9	9.1	.1	1.9	10.3	1.1	9.1	.1	1:8.5
Sugar beet, "	82.2	81.5	.7	17.8	1.0	1.3	15.4	.1	1.3	16.5	1.0	15.4	.1	1:15.7
Carrot, "	85.9	85.0	.9	14.1	1.4	1.7	19.8	.2	1.7	12.4	1.4	10.8	.2	1:8.1
Turnip, "	92.7	92.0	.7	7.3	1.1	.8	5.3	.1	.8	6.5	1.1	5.3	.1	1:5.1
GRAINS AND SEEDS.														
Wheat, good	16.1	14.4	1.7	83.9	13.0	3.0	66.4	1.5	7.9	76.0	11.7	63.1	1.2	1:5.6
Rye, "	16.1	14.3	1.8	83.9	11.0	3.5	67.4	2.0	8.4	75.5	9.9	64.0	1.6	1:6.9
Barley, "	16.5	14.3	2.2	83.5	10.0	7.1	63.9	2.5	6.3	67.2	8.0	57.5	1.7	1:7.7
Oats, "	17.0	14.3	2.7	83.0	12.0	9.3	55.7	6.0	27.5	55.5	9.0	41.8	4.7	1:6.0
Maize, "	15.9	14.4	1.5	84.1	10.0	5.5	62.1	6.5	13.1	71.0	8.4	57.8	4.8	1:8.3
Buckwheat, "	15.8	14.0	1.8	84.2	9.0	15.0	58.7	1.5	32.2	52.0	6.8	44.0	1.2	1:6.9
Peas, "	16.7	14.3	2.4	84.3	22.4	6.4	52.5	2.0	12.5	71.8	20.2	49.9	1.7	1:2.7
Beans, "	17.6	14.5	3.1	82.4	25.5	9.4	45.9	1.6	14.4	68.0	23.0	43.6	1.4	1:2.1
Flax-seed, "	15.7	12.3	3.4	84.3	20.5	7.2	19.5	37.0	16.6	67.7	17.2	15.3	35.2	.....
Cotton, "	15.5	7.7	7.8	84.5	22.8	16.0	15.4	30.3	28.5	56.0	17.1	11.6	27.3	.....
Poppy, "	20.0	14.7	5.3	80.0	17.5	6.1	15.1	41.0	14.0	66.0	14.7	12.3	39.0	.....
MISCELLANEOUS.														
Sugar beet pulp	73.4	70.0	3.4	26.6	1.8	6.3	18.3	.2	6.3	20.3	1.8	18.3	.2	1:10.4
Brewers' grains	77.8	76.6	1.2	22.2	4.9	6.2	10.6	.5	8.4	13.8	3.9	9.5	.4	1:2.7
Wheat bran	18.5	13.1	3.4	81.5	14.0	17.8	45.9	3.8	29.6	51.9	10.9	37.6	3.4	1:4.2
Barley meal	16.8	12.1	5.4	83.2	14.8	19.4	45.6	4.1	30.7	52.5	11.5	37.4	3.6	1:4
Rape cake	22.4	15.0	7.4	77.6	30.3	13.8	23.8	9.5	27.4	50.2	24.2	18.3	7.7	1:1.6
Linseed cake	19.4	11.5	7.9	80.6	28.3	11.0	37.3	10.0	18.9	61.7	23.8	29.0	8.9	1:2.2
Linseed meal (pressed)	17.7	9.7	7.3	83.0	34.2	6.6	37.7	4.5	20.9	62.1	28.7	29.4	4.0	1:1.4
Palmnut meal (pressed)	12.9	9.0	3.9	87.1	18.5	28.6	36.7	3.3	31.5	55.6	18.5	33.8	3.3	1:2.3
Palmnut cake	12.1	9.1	3.8	87.3	16.3	21.5	36.4	13.1	24.4	62.9	16.3	33.5	13.1	1:4.1
Cotton seed cake, undecorticated ..	17.8	11.5	6.3	82.2	24.6	20.8	30.6	6.2	44.4	37.8	18.1	14.1	5.6	1:1.6
Cotton seed cake, decorticated	17.8	10.1	7.7	82.2	34.3	9.6	27.4	10.9	26.5	55.7	28.8	17.0	9.9	1:1.5
Cow milk	88.2	87.5	.7	11.8	3.2	.....	5.0	3.6	44.3	11.8	3.2	5.0	3.6	1:4.4
Skim milk	90.8	90.0	.8	9.2	3.0	.....	5.6	6.00	9.2	3.0	5.6	.....	.6	1:2.4
Buttermilk	90.6	90.1	.5	9.4	3.0	.....	5.4	1.00	9.4	3.0	5.4	1.0	.....	1:2.6
Whey	93.9	93.3	.6	6.1	.....	.....	.5	3.00	6.1	.....	.8	.....	.3	1:7.2
Cream	62.6	62.0	.6	37.3	2.7	.....	2.9	31.8	62.6	37.4	2.7	2.9	31.8	1:30.5

In the preceding tables the "organic substance" represents the sum of the *Albuminoids*, *Crude fibre*, *Carbohydrates*, and *Fat*; while the "inorganic substance" represents the sum of the *Water* and *Ash*.

The sum of the digestible carbohydrates and the fat reduced to its "starch equivalent," divided by the amount representing the digestible *Albuminoids*, gives the *nutritive ratios* of the last column.

The "indigestible organic substance" is found by subtracting the sum of the digestible substances from the amount of "organic substance."

In analysis where the percentage of digestible substance is given, further calculation is not necessary in compounding a *ration* based on a particular *feeding standard*; but in cases where the analysis of a fodder is given without the proportion of digestible substance in each ingredient, it becomes necessary to make use of the so-called "digestion co-efficients."

<i>Albuminoids</i> ,	56 per cent
<i>Crude fibre</i> ,	57 "
<i>Carbohydrates</i> ,	63 "
<i>Fat</i> ,	48 "

and calculate the percentage of digestible substance according to the method already given, page 497.

III.—VALUATION OF FERTILIZERS.

The valuation of a fertilizer signifies ascertaining its worth in money, or its trade value—a value which is not necessarily proportional to its fertilizing effects.

Plaster, lime, stable manure, and nearly all of the less expensive fertilizers, have quite variable prices, which bear no close relation to their chemical composition, but superphosphates and some other fertilizers depend chiefly for their trade value on the three substances, *nitrogen*, *phosphoric acid* and *potash*, which are comparatively costly and quite steady in price.

Experience has settled the general principle that these are absolutely essential to the growth and maturity of all crops; that they are the only expensive substances that are essential, and consequently are the only ingredients on which an estimated value is placed. The prices attached to these substances may vary with the market, and thus we may expect them to change from time to time. Below is given the prices at which the various forms in which these substances are sold were rated at, 1880.

Nitrogen is commercially the most fertilizing element. It occurs in various forms. *Organic nitrogen*, as the nitrogen of animal and vegetable matters generally existing in the albumen and fibrin of meat and blood, in the uric acid of bird excrement, and in the urea of urine. Some forms of *organic nitrogen*, as that of blood and meat, are very active as fertilizers; others, as that of hair, slow in their effect on vegetation. *Ammonia* and *nitric acid* are results from the decay of *organic nitrogen* in the soil and manure heap, and are the most active forms of nitrogen. The former occurs in commerce as sulphate of ammonia, and the latter as nitrate of soda.

Phosphoric acid occurs as *soluble*, *reverted* and *insoluble*.

Soluble phosphoric acid implies phosphoric acid or phosphates that are freely soluble in water. It is the characteristic ingredient of *superphosphates*, in which it is produced by acting on insoluble phosphate with *sulphuric acid*. It is not only readily taken up by plants, but is distributed through the soil by rain.

Reverted phosphoric acid is phosphoric acid that was freely soluble in water, but has undergone a chemical change and become insoluble, but is soluble in a strong solution of ammonia citrate. It can be assimilated by crops, but has less value than soluble phosphoric acid, as it does not distribute so freely by rain.

Insoluble phosphoric acid implies various phosphates not freely soluble in water or ammonium citrate.

Potash is the valuable fertilizing ingredient of "potashes" and "potash salts." It is usually sold in the form of a sulphate or chloride.

The average trade values or cost in market, per pound, of the ordinary forms of *nitrogen*, *phosphoric acid* and *potash* for 1880, was :—

Nitrogen in nitrates	26	cts. per lb.
“ “ ammonia salts	22½	“ “
“ “ fine ground bone	18	“ “
“ “ medium bone	16½	“ “
“ “ coarse bone	15	“ “
“ “ organic matter, blood, fish, etc.	20	“ “
Phosphoric acid soluble in water	12½	“ “
“ “ “reverted”	9	“ “
“ “ insoluble fine bone	7	“ “
“ “ “ coarse	5½	“ “
“ “ “ fine ground rock	3½	“ “
Potash in high grade sulphate	7½	“ “
“ “ low grade “	6	“ “
“ “ muriate or potassium chloride	4½	“ “

To estimate the value of a fertilizer from this table of prices, it is necessary to have an analysis of the fertilizer, which should always be supplied by the vendor. It is hoped that the time is not far distant when our Government will require an analysis of every fertilizer offered for sale. With this information the farmer will readily be able to estimate its value as follows: Multiply the pounds per hundred of nitrogen, etc., by the trade values per pound. This gives the values of the several ingredients, which added together is the value per hundred pounds of the fertilizer. Multiplying this sum by 20 gives the price per ton.

e.g.—Suppose the analysis of a certain fertilizer gives

Nitrogen in organic matter	2	per cent.
Soluble phosphoric acid	3	“
Reverted	4	“
Insoluble	5	“
Potash as sulphur	2	“
2 lbs. nitrogen or organic matter	@ .20	= .40
3 “ soluble phosphoric acid	@ .12½	= .37½
4 “ reverted	@ .09	= .36
5 “ insoluble	@ .07	= .35
2 “ potash sulphate	@ .07½	= .15

Total value of one hundred pounds fertilizer 1.63½

Then $1.63\frac{1}{2} \times 20 = 32.70$, the estimated value of a ton.

Further examples of analyses of superphosphates, with estimated and cost prices compared :—

	No. 1.	No. 2.	No. 3.	No. 4.
Nitrogen	1.68	2.59	3.92	1.67
Soluble phosphoric acid	1.98	4.57	6.03	3.83
Reverted “ “	3.66	1.70	4.96	5.99
Insoluble “ “	4.77	3.77	1.70	6.01
Potash (as Chloride)		7.31		.60
Estimated value of a ton	\$24 94	\$36 70	\$42 06	\$35 99
Cost value or selling price	\$24 00	\$38 00	\$60 00	\$40 50

In furnishing the analyses of a fertilizer, it is usual to give the percentage of the ingredients as above and not the combinations in which they occur, such as phosphate of lime, organic matter, and ammonia.

If the *estimated* value is much below the selling price, the fertilizer is likely to be adulterated. See No. 3.

In many parts of the United States this method of estimating the value of the fertilizer has been followed for some time with most satisfactory results, in placing a check on the tendency of some manufacturers to practise adulterations.

This will be better understood by the following instance :—A certain fertilizer was sold as “a composition for grass” with considerable success, at the rate of \$32 per ton. On an analysis being made, its value was estimated at \$1.03 per ton. The publication of this fraud caused the vendor to shift his operations to another State, where his dishonesty was less known.

IV.—ANALYSIS OF THE ASH OF PLANTS.

In the analysis of a plant, two classes of substances are considered ; the analysis of the organic substance of the plant, and the analysis of the inorganic. The foregoing analyses refer principally to the organic constituents, while the following has reference to the inorganic compounds which enter into the composition of plants. The former are of special importance in feeding, and are elaborated by the plant itself ; the latter are chiefly taken up by the plant from the soil, and are of importance in considering the question of soil exhaustion.

The percentage of ash in the dry matter of plants (that obtained by drying the plants at a temperature of 212°, until they cease to lose weight), is usually from 3 to 6 per cent. of the entire plant. In the seeds the amount of ash is small, but in the leaves it sometimes reaches 20 per cent.

The average percentage of ash is usually given as follows :—

Wheat grain.....	1.9	Buckwheat straw.....	6.1
Oat “	2.9	Flax “	3.7
Barley “	2.2	Potato	4.3
Rye “	2.6	Mangold	8.5
Corn “	1.5	Turnip	9.0
Beans “	3.6	Carrot	8.0
Peas “	2.7	White Turnip	6.0
Wheat straw.....	5.0	Sugar Beet	4.35
Oat “	5.4	Red Clover, whole plant..	6.8
Barley “	6.7	White Clover	7.3
Rye “	5.2	Timothy	7.0
Corn “	5.5	Lucerne.....	7.14
Pea “	6.2		

The composition of the ash of plants, per one hundred parts, is given in the following table, compiled from the results of many analyses (excluding Carbonic Dioxide):—

SUBSTANCE.	Potash.	Soda.	Magnesia.	Line.	Ferric oxide.	Phosphoric Acid.	Sulphuric Acid.	Silica.	Chlorine.
1. Wheat (grain)	31.54	2.66	12.10	3.14	Trace.	48.5	1.08	1.83	.10
2. Rye "	30.9	1.8	10.9	2.7	.....	47.5	2.3	1.9	.....
3. Barley "	21.28	4.0	9.10	2.40	.15	33.17	2.10	27.5	.30
4. Oat "	37.48	2.4	7.8	3.0	.6	20.8	1.8	25.9	.22
5. Corn "	37.95	3.0	7.5	3.4	.4	44.8	1.5	1.45	Trace.
6. Beans "	40.5	1.2	6.7	5.2	.2	37.0	5.1	1.0	2.9
7. Peas "	40.4	3.7	8.0	4.7	.6	36.3	3.13	.9	2.3
8. Flax "	30.4	2.61	16.23	9.45	.38	35.9	1.43	1.76	1.70
9. Buckwheat	23.1	6.2	34.4	3.3	.....	48.0	2.1	.....	1.7
10. Potatoes	61.6	1.0	5.0	2.4	.85	18.67	6.25	2.0	2.23
11. Mangolds (yellow).....	35.09	28.9	2.5	2.5	.66	6.16	3.19	3.0	18.0
12. Mangolds (red)	25.18	32.10	2.6	2.2	.50	2.16	4.0	1.6	30.0
13. Beets, sugar.....	49.4	9.6	8.9	6.6	.....	14.3	4.7	3.7	2.0
14. Carrot	41.46	17.6	5.36	8.86	.32	12.68	6.93	2.0	4.79
15. Carrot (tops).....	16.0	23.1	4.6	33.0	.....	4.7	7.9	5.6	7.1
16. Turnips.....	39.3	11.8	3.9	10.4	.....	13.3	14.3	2.4	4.2
17. Turnips (tops).....	23.9	7.9	4.7	32.4	.....	8.9	9.9	3.8	8.4
18. Maize.....	32.3	1.2	5.5	10.5	.8	8.1	5.2	38.0	.....
19. Wheat (straw).....	12.16	1.0	4.0	6.82	1.02	3.2	5.78	65.34	.6
20. Oat "	21.6	6.0	3.66	8.1	.83	4.16	3.32	50.8	3.25
21. Flax "	37.9	5.6	7.1	22.3	.....	11.5	5.3	6.0	4.0
22. Buckwheat (straw).....	46.6	2.2	3.6	18.4	.....	11.9	5.3	5.5	7.7
23. Barley "	19.32	4.5	2.7	7.0	.26	4.83	3.78	56.8	.76
24. Pea "	22.0	6.0	7.34	39.0	1.08	6.84	6.30	6.18	5.26
25. Lucerne.....	25.3	2.0	5.8	48.4	.....	8.5	6.1	2.0	1.9
26. Timothy	28.8	2.7	3.7	9.4	.....	10.4	3.9	36.2	4.9
27. Red Clover	31.86	2.16	12.16	31.09	.66	9.0	3.03	6.71	3.3
28. White Clover	17.5	7.8	10.8	33.2	.....	14.1	8.8	4.5	3.2
29. Hops	37.3	2.8	5.5	16.9	.....	15.1	2.6	16.4	3.4
30. Tobacco.....	27.4	3.7	10.5	37.0	.....	3.6	3.9	9.6	4.5

The following table is frequently used for calculating the exhaustion of soils by certain crops. As the figures are taken from European sources, they may be considered as a close approximation to the true analysis of the substances mentioned:—

VEGETABLE MATERIALS, 1,000 pounds contain:	COMPOSITION OF THE MINERAL MATTER.									
	Water, derived from the air.	Organic matter from the atmosphere.	Mineral matter derived from the soil.	Nitrogen in or from granitic matter, the soil.	Soda.	Lime.	Magnesia.	Phosphoric Acid.	Sulphuric Acid.	Silica.
GRAIN AND STRAW.										
Wheat, grain	14.3	840.1	16.9	20.8	0.4	0.6	2.0	7.9	0.1	0.4
Wheat, straw	14.1	812.9	46.1	4.8	0.6	2.7	1.1	2.2	1.1	31.2
Rye, grain	14.3	839.1	17.6	17.6	0.3	0.5	2.1	8.4	0.2	0.4
Rye, straw	11.3	816.5	40.5	4.0	0.9	3.5	2.1	9.1	1.1	22.9
Oats, grain	14.3	830.0	19.2	19.2	0.6	0.6	1.9	6.2	0.4	12.0
Oats, straw	14.3	816.6	40.4	5.6	1.2	3.6	1.6	1.9	1.3	19.6
Corn, grain	14.4	843.0	13.0	16.0	0.2	0.3	2.0	5.9	0.2	0.2
Corn, stalks and leaves	15.0	808.1	41.9	4.8	6.1	4.0	2.6	3.3	1.2	11.7
Buckwheat, grain	14.0	848.2	11.8	14.4	0.7	0.7	1.5	5.7	0.2	0.1
Buckwheat, straw	16.0	788.3	51.7	13.0	1.1	9.5	1.9	6.1	2.7	2.9
Beans, grain	14.5	824.3	30.7	40.8	0.4	1.5	2.2	11.9	0.8	0.2
Beans, straw	16.0	796.1	43.9	16.3	1.1	9.8	3.3	3.2	1.6	3.2
Peas, grain	14.3	833.5	23.5	35.8	0.2	1.2	1.9	8.9	0.8	0.2
Peas, straw	16.0	796.0	44.0	10.4	1.8	16.2	3.5	3.5	2.7	3.0
HAY.										
Meadow Hay	14.3	805.5	51.5	15.5	2.3	8.6	3.3	4.1	2.4	13.9
Timothy Hay	14.3	784.9	62.1	15.5	1.5	4.5	1.9	7.2	1.8	22.1
Red Clover Hay	16.0	783.1	56.9	19.7	1.2	20.0	6.1	5.6	1.7	1.4
Lucerne	16.0	777.9	62.1	23.0	1.3	26.2	3.3	5.5	3.7	3.8
GREEN CROPS.										
Timothy, grass	70.0	278.4	21.6	5.4	0.5	1.6	0.7	2.5	0.6	7.7
Rye, fodder	76.0	223.7	16.3	5.3	0.1	1.3	0.5	2.4	0.2	5.2
Corn, fodder	82.2	166.0	12.0	1.9	0.5	1.6	1.4	1.3	0.4	1.7
Red Clover in blossom	78.0	206.3	13.7	5.1	0.3	4.8	1.5	1.4	0.4	0.3
ROOTS.										
Potatoes, tubers	75.0	240.6	9.4	3.4	0.2	0.2	0.4	1.6	0.6	0.2
Potatoes, vines	77.0	210.3	19.7	4.9	0.4	6.4	3.3	1.6	1.3	0.9
Turnips, tops	89.8	90.1	11.9	3.0	1.1	3.9	0.5	0.9	1.1	0.5
Turnips, roots	92.0	72.7	7.3	1.8	0.7	0.8	0.3	0.9	0.8	0.1
Sugar Beets, roots	81.5	177.9	7.1	1.6	0.7	0.4	0.5	0.8	0.3	0.1
Sugar Beets, tops	89.7	81.9	18.1	3.0	0.7	2.7	2.7	4.3	0.9	0.7
Carrot, roots	85.0	142.2	7.8	2.2	1.7	6.9	0.4	1.0	0.5	0.2
Carrot, tops	82.2	152.0	26.0	5.1	5.2	8.5	0.9	1.2	2.0	2.3

The following are some calculations based upon the foregoing table, showing the materials and the amount removed from the soil by our most common crops:—

CROP.	Sulphuric Acid.	Phosphoric Acid.	Lime.	Magnesia.	Potash.	Nitrogen.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
OATS—						
Grain, 30 bushels=960 lbs. ....	.4	6.	1.0	1.8	4.2	18.4
Straw, 2,000 lbs.	2.6	3.8	7.2	3.2	17.8	11.2
Total	3.0	9.8	8.2	5.0	22.0	29.6
WHEAT—						
Grain, 20 bushels=1,200 lbs. ....	.1	9.5	.7	2.4	6.4	25.
Straw, 3,000 lbs.	3.3	6.6	8.1	3.3	18.9	14.4
Total	3.4	16.1	8.8	5.7	25.3	39.4
CORN—						
Grain, 50 bushels=2,800 lbs. ....	.6	16.5	.8	5.6	10.4	44.8
Straw, 6,500 lbs.	7.8	34.5	26.0	16.9	62.4	31.2
Total	8.4	51.0	26.8	22.5	72.8	76.0
RYE—						
Grain, 25 bushels=1,400 lbs. ....	.3	11.8	.7	2.9	7.8	24.6
Straw, 3,500 lbs.	3.8	7.3	12.2	3.9	27.3	14.0
Total	4.1	19.1	12.9	6.8	35.1	38.6
MEADOW HAY—						
1½ tons=3,000 lbs.	7.2	12.3	25.8	9.9	39.6	46.5
POTATOES—						
Tubers, 150 bushels=9,000 lbs.	5.4	1.44	1.8	3.6	51.3	30.6
TURNIPS—						
Roots, 4,000 lbs.	3.2	3.6	3.2	.9	9.9	5.4

An examination of the preceding tables will enable you to understand how some plants are much more exhaustive upon soils than others, and how continual cropping removes from the soil mineral ingredients which must be returned or impoverishment takes place. It will also show that many plants abstract a large amount of potash from the soil, others much lime, while some carry off phosphoric acid. Hence we find such terms as *potash* and *lime* plants in use.

A great deal could be said on what is suggested by a comparison of the figures in the preceding tables; but, as the limit of my work is reached, I leave what has been said to be carefully considered by those for whom it has been written. If the remarks on cattle-feeding and a compilation of useful analyses prove interesting and instructive to the students of the Ontario Agricultural College, I shall feel amply repaid for any time spent in the collection of data required, or trouble experienced in preparing this paper for their perusal.

Your obedient servant,

J. HOYES PANTON,

*Professor of Chemistry and Lecturer on
Geology and Meteorology.*

R E P O R T
OF
T H E P H Y S I C I A N .

ONTARIO AGRICULTURAL COLLEGE,
GUELPH, 27TH DECEMBER, 1881.

To the Honourable the Commissioner of Agriculture :

SIR,—I have the honour to present my Annual Report as Medical Officer of the Ontario Agricultural College.

During last winter we had more than the average amount of sickness, influenza being epidemic in the city and neighbourhood; many of the students were attacked with the disease. During the prevalence of influenza many of the young men suffered from sore throat, the result of cold.

Following the influenza we had an epidemic of measles, but owing to the great care taken by the officers of the Institution, there were only ten of the young men and three of the servants who contracted the disease.

This is the first time in the history of the College that we have been visited by an epidemic, and we are glad to be able to report that we had not a single death. About this time we had four cases of erysipelas, but only one of them was of a bad type, and he ultimately made a good recovery.

The other ailments have been just such as we meet with in every-day practice.

Owing to the large increase of students, we, as a matter of course, have had more requiring medical aid this year than any previous year.

I am ever ably assisted by the President and those under him whose duty it is to look after the comfort of the students, whether in sickness or in health.

I cannot close this Report without saying that the great difficulty we had to contend with during the prevalence of the epidemic was that we had not a properly isolated sick room into which the patients could at once be removed, and thus prevent the spreading of the disease.

I have the honour to be, Sir,

Your obedient servant,

E. W. MCGUIRE.

APPENDIX 1.

1.—COLLEGE ROLL FOR THE YEAR 1881.

2.—COLLEGE ROLL FOR THE SESSION 1881-'82 (1st OCT. TO 31st MARCH).

1.—COLLEGE ROLL FOR THE YEAR 1881.

NAME.	P. O. ADDRESS.	COUNTY, &c.
Anderson, Harry F	London	Middlesex (London City).
Anderson, John P.	Guelph	Wellington.
Armstrong, Christian	Knowlton	Quebec.
Armstrong, Francis	Knowlton	Quebec.
Ballantyne, William	Stratford	Perth.
Barclay, Edmund H.	St. Andrews	Scotland.
Bansley, John	Toronto	York (Toronto City).
Batty, Jonathan	Meaford	Grey.
Begg, Robert H.	Bracebridge	Victoria.
Bell, James	Montreal	Montreal.
Beaudet, George	Quebec	Quebec.
Bethune, Kenneth	Ottawa	Carleton (Ottawa City).
Bignell, Edward	Claude	Peel.
Blake, Oliver C.	Waterford	Norfolk.
Blanchard, Monson	Windsor	Nova Scotia.
Bowes, James B.	Pinkerton	Bruce.
Bowes, James C.	Halifax	Nova Scotia.
Bowman, Byron	West Montrose	Waterloo.
Broughton, Charles J.	Hamilton	Wentworth (Hamilton City)
Brown, William	Guelph	Wellington.
Cameron, Henry H.	Ottawa	Carleton.
Carnegie, John	Peterboro'	Peterboro'.
Carpenter, Charles	Simcoe	Norfolk.
Chase, Oscar	Cornwallis	Nova Scotia.
Charleton, George H.	St. George	Brant.
Chipman, Percy H.	Montreal	Montreal.
Clark, Charles	Parkdale	York.
Clark, Frank	Parkdale	York.
Clarke, Harry	Ottawa	Carleton (Ottawa City).
Clutton, John G.	Milburn	Huron.
Cowley, Ernest A. E.	Windsor	England.
Creelman, James H.	Collingwood	Grey.
Cross, Alfred E.	Montreal	Montreal.
Cunningham, C. G.	Ottawa	Carleton (Ottawa City).
Cuppige, Alexander	Orillia	Simcoe.
Cutting, Aubrey N.	Gayton Lynn	England.
Davis, Robert A.	Cayuga	Haldimand.
Dawson, John	South Zorra	Oxford.
Day, Forshaw	Kingston	Frontenac (Kingston City).
Dennis, James F.	Weston	York.
De Koerber, Victor	Toronto	York (Toronto City).

1.—COLLEGE ROLL FOR THE YEAR 1881—*Continued.*

NAME.	P. O. ADDRESS.	COUNTY, &c.
De Veber, William H.	St. John	New Brunswick.
Dewar, John	Tiverton	Bruce.
Dickenson, Charles S.	Seaforth	Huron.
Dickenson, Samuel	Zion	Durham.
Dickinson, George A.	Zion	Durham.
Duthie, James	Guelph	Wellington.
Donaldson, John	Wolfeville	Nova Scotia.
Douglas, Joseph	Blake	Huron.
Dunlop, John	Woodstock	Oxford.
Eddington, Dugald	Glencreggan	Scotland.
Elworthy, Robert	Norwich	Oxford.
Edmondson, James A.	Utopia	Simcoe.
Eggleston, George	Ancaster	Wentworth.
Eidt, William	Philipsburg, West	Waterloo.
Ffolkes, Edward	Hillington Lynn	England.
Ffolkes, Robert	Hillington Lynn	England.
Ferguson, George A.	Kingston	Frontenac (Kingston City).
File, John J.	Brantford	Brant.
Fotheringham, James	St. Mary's	Perth.
Fotheringham, William	St. Mary's	Perth.
Forbes, Edward R.	Toronto	York (Toronto City).
Fraser, Thomas H.	Kinburn	Carleton.
Frith, Henry M.	St. John	New Brunswick.
Garland, Collins S.	Montreal	Montreal.
Gaw, William W.	Leadville	Colorado, U.S.
George, Alexander	Keith	Scotland.
Gibb, J. Gordon	Ottawa	Carleton.
Gibson, William J.	Ottawa	Carleton (Ottawa City).
Gibson, Robert	Glen Allen	Wellington.
Gillespie, Joseph H.	Innerkip	Oxford.
Gilpin, Randolph	Halifax	Nova Scotia.
Gilpin, William	Ottawa	Carleton.
Glass, William	East Zorra	Oxford.
Goold, George Ernest	Kingston	Frontenac (Kingston City).
Grant, William M.	Woodville	Victoria.
Green, E. Herbert	Toronto	York (Toronto City).
Green, Henry	Waterford	Norfolk.
Greenlaw, Fred. William	Plymouth	England.
Gregory, John	Fredericton	New Brunswick.
Grindley, Arthur W.	Wolfe's Island	Frontenac.
Horne, William H.	North Keppel	Grey.
Hill, James L.	Ottawa	Carleton (Ottawa City).
Howitt, William	Guelph	Wellington.
Holtermann, Richard	Toronto	York.
Halley, Frederick	Merthyr Tydfil	Wales.
Henderson, Daniel	Loch Winnoch	Renfrew.
Holcroft, Harry S.	Orillia	Simcoe.
Hutton, John R.	St. Catharines	Lincoln.
Hutton, William E.	St. Catharines	Lincoln.
Havard, Benjamin	Merthyr Tydfil	Wales.
Hopkins, John A.	Holt	York.
Holden, Walter L.	Hamilton	Wentworth (Hamilton City)
Job, John	Waterdown	Wentworth.
Jones, George B.	Guelph	Wellington.
Jones, William S.	Halifax	Nova Scotia.
Jones, William H.	Merthyr Tydfil	Wales.
Jeffs, Herbert B.	Bond Head	Simcoe.
Joseph, Stewart S.	Quebec	Quebec.
Kippen, Horace B.	Lennoxville	Quebec.
Kestell, Robert H.	Simcoe	Norfolk.
Knott, Edgar	Portsmouth	England.
King, John E.	Middlemarch	Elgin.
Law, F. E.	Stratford	Perth.
Landsborough, John	Clinton	Huron.
Leask, John	Pinkerton	Bruce.
Lindsay, William David	Woodstock	Oxford.
Lindsay, Samuel George	Woodstock	Oxford.
Lewis, William	Montreal	Montreal.
Lough, William H.	Clinton	Huron.

1.—COLLEGE ROLL FOR THE YEAR 1881—*Continued.*

NAME.	P. O. ADDRESS.	COUNTY, &c.
Luton, Edward E.	New Sarnam	Elgin.
Lowry, Charles E. C.	London	England.
McNaughton, James.	Laggan	Glenarry.
Motherwell, William R.	Perth	Lanark.
McIlquham, John	Lanark.	Lanark.
McIlquham, William	Lanark.	Lanark.
Myhne, Robert C.	Smith's Falls	Lanark.
Macaulay, Herbert	Hamilton	Wentworth.
McFarlane, David	Montreal	Montreal.
McArthur, John	Ailsa Craig	Middlesex.
McLeod, Martin D.	Oak Ridges	York.
Myers, William	Guelph	Wellington.
Moore, Charles J.	Toronto	York (Toronto City).
Matthewman, Ernest	Ottawa	Carleton (Ottawa City).
Mahony, E. C.	Hamilton	Wentworth (Hamilton City)
Major, Charles	Croydon	England.
Magor, John	Montreal	Montreal.
McPhail, Ernest	Toronto	York (Toronto City).
McLaren, Peter	Perth	Lanark.
McPherson, Duncan	Glanworth	Middlesex.
McDonald, John	Petrolia	Lambton.
McNish, Charles H.	Lyn	Leeds.
McKercher, William	Wroxeter	Huron.
McLenman, Daniel	Camertonown	Glenarry.
Morton, Francis G.	Barrie	Simcoe.
Maunsell, George S.	Ottawa	Carleton (Ottawa City).
Messecar, Charles L.	Scotland	Brant.
Minard, William F.	St. Thomas	Elgin.
Montcith, William	Exeter	Huron.
Millson, Matthew	Glanworth	Middlesex.
Maughan, Walter E.	Owen Sound	Grey.
Nicol, George	Cataraqui	Frontenac.
Newton, John	Weston	York.
Noble, Frederick	Toronto	York.
Newport, Edward F.	St. George	Bermudas.
Neilson, James	Lyn	Leeds.
Ord, William	Toronto	York (Toronto City).
Pope, Edward	Sarawak	Grey.
Pope, Herbert	Sarawak	Grey.
Phin, William E.	Hespeler	Waterloo.
Phin, Richard J.	Hespeler	Waterloo.
Patton, William	Montreal	Montreal.
Philbin, Thomas R.	Ottawa	Carleton.
Poe, James P.	Callan	Ireland.
Pettapiece, William	Manotick	Carleton.
Pope, Alfred H.	London	England.
Perry, Donald E.	Ottawa	Carleton (Ottawa City).
Patterson, William	Merritton	Lincoln.
Ross, James G.	Montreal	Montreal.
Robins, William	Beamsville	Lincoln.
Ross, William J.	Smith's Falls	Lanark.
Rae, William B.	London	England.
Ramsay, Robert	Eden Mills	Wellington.
Rogers, Frederick	Deans	Haldimand.
Roblin, Adelbert G.	Rednersville	Prince Edward.
Redmond, Samuel	Peterboro'	Peterboro'.
Raines, G. R.	Côte St. Antoine	Montreal.
Ryall, Frank	Paris	Brant.
Raikes, Harry	Barrie	Simcoe.
Riddell, Alfred	Kinburn	Carleton.
Rennie, Ernest	Hamilton	Wentworth (Hamilton City)
Robinson, Jesse D.	Middlemarch	Elgin.
Robertson, William	Hanstead	Lambton.
Routh, Rudolph	Montreal	Montreal.
Rose, George M.	Toronto	York (Toronto City).
Surtees, William S.	Ottawa	Carleton (Ottawa City).
Small, Alexander T.	Ottawa	Carleton (Ottawa City).
Silverthorn, Newman	Somerville	Peel.
Scott, Archie	Hastings	Northumberland.

1.—COLLEGE ROLL FOR THE YEAR 1881—*Continued.*

NAME.	P. O. ADDRESS.	COUNTY, &c.
Segsworth, Frederick	Monck	Wellington.
Skaife, John	Montreal	Montreal.
Stover, William John	Norwich	Oxford.
Shaver, Charles B.	Stratford	Perth.
Schüll, Charles B.	Guelph	Wellington.
Stonehouse, Marshall	Shirley	Ontario.
Smith, Miles H.	Oakville	Halton.
Shuttleworth, Arthur	Mount Albert	York.
Shearer, Edward	Ottawa	Carleton (Ottawa City).
Skinner, Andrew	Woodstock	Oxford.
Smith, John A.	Martintown	Glengarry.
Smith, J. Lloyd	Ottawa	Carleton (Ottawa City).
Smith, Frank W.	Scotland	Brant.
Strange, Alexander W.	Kingston	Frontenac (Kingston City).
Stephenson, Charles	Fingal	Elgin.
Schwartz, Yohann	Quebec	Quebec.
Torrance, W. Percy	Guelph	Wellington (Guelph City).
Templar, William	Jerseyville	Wentworth.
Tronson, Harold	Oakville	Halton.
Terhune, Frederick	Brantford	Brant.
Tourangeau, Adolphus	Quebec	Quebec.
Townsend, Kirkley	Aldershot	Wentworth.
Torrance, Wilfred J.	Ottawa	Carleton (Ottawa City).
Thomas, Frank J.	Oxford	England.
Willis, Thomas	Whitby	Ontario.
Woodley, Francis	Quebec	Quebec.
Wilson, William A.	Ottawa	Carleton (Ottawa City).
Watt, James M.	Montreal	Montreal.
Watt, D. A.	Montreal	Montreal.
Ward, Thomas M.	Stanhope	Quebec.
White, William G.	Lanark	Lanark.
White, Charles	Lanark	Lanark.
Wyndham, Walter	Roach's Point	York.
Wettlaufer, Frederick	Tavistock	Perth.
Williams, Albert W.	Culloden	Oxford.
Walker, Robert B.	Diamond	Carleton.
Wilcocks, Frederick H.	Richmond	Quebec.
Willis, William B.	Whitby	Ontario.
Total		217

2.—COLLEGE ROLL FOR THE SESSION 1881-'82 (1st OCT. TO 31st MARCH).

NAME.	P. O. ADDRESS.	COUNTY, &c.
Anderson, Harry F.	London	Middlesex (London City).
Barclay, Edmund H.	St. Andrews	Scotland.
Begg, Robert A.	Bracebridge	Victoria.
Bethune, Kenneth	Ottawa	Carleton (Ottawa City).
Bignell, Edward	Claude	Peel.
Blanchard, Monson	Windsor	Nova Scotia.
Bowes, James B.	Pinkerton	Bruce.
Bowes, James C.	Halifax	Nova Scotia.
Bowman, Byron	West Montrose	Waterloo.
Broughton, Charles J.	Hamilton	Wentworth (Hamilton City)
Brown, William	Guelph	Wellington.
Cameron, Henry H.	Ottawa	Carleton.
Carnegie, John	Peterboro'	Peterboro'.
Carpenter, Charles	Simcoe	Norfolk.

2.—COLLEGE ROLL FOR THE SESSION 1881-'82—*Continued.*

NAME.	P. O. ADDRESS.	COUNTY, &c.
Chase, Oscar.....	Cornwallis	Nova Scotia.
Clark, Charles.....	Parkdale	York.
Clark, Frank.....	Parkdale	York.
Cowley, Ernest H. E.....	Windsor Castle.....	England.
Creelman, James.....	Collingwood	Grey.
Cunningham, C. G.....	Ottawa.....	Carleton (Ottawa City).
Cutting, Aubrey A.....	Gayton Lynn.....	England.
Davis, Robert A.....	York.....	Haldimand.
Dawson, John J.....	South Zorra.....	Oxford.
Day, Forshaw.....	Kingston.....	Frontenac (Kingston City).
Dennis, James F.....	Weston.....	York.
De Veber, William H.....	St. John.....	New Brunswick.
Dewar, John D.....	Tiverton.....	Bruce.
Duthie, James.....	Guelph.....	Wellington.
Dickenson, George H.....	Zion.....	Durham.
Donaldson, John.....	Wolfville.....	Nova Scotia.
Eddington, Dugald.....	Glencreggan.....	Scotland.
Elworthy, Robert.....	Norwich.....	Oxford.
Edmondson, James A.....	Utopia.....	Simcoe.
Eidt, William.....	Philipsburg, West.....	Waterloo.
Ffolkes, Robert W. E.....	Hillington Lynn.....	England.
Ferguson, George A.....	Kingston.....	Frontenac (Kingston City).
Fotheringham, William.....	St. Mary's.....	Perth.
Fraser, Thomas.....	Kinburn.....	Carleton.
Frith, Henry M.....	St. John.....	New Brunswick.
Garland, Collins S.....	Montreal.....	Montreal.
Gillespie, Joseph H.....	Innerkip.....	Oxford.
Gilpin, Randolph.....	Halifax.....	Nova Scotia.
Gilpin, William.....	Ottawa.....	Carleton.
Goold, G. Ernest.....	Kingston.....	Frontenac.
Greenlaw, Frederick William.....	Plymouth.....	England.
Gregory, John.....	Fredericton.....	New Brunswick.
Grindley, Arthur W.....	Wolfe Island.....	Frontenac.
Howitt, William.....	Guelph.....	Wellington.
Hallesy, Frederick.....	Merthyr Tydfil.....	Wales.
Holcroft, Harry S.....	Orillia.....	Simcoe.
Hutton, John R.....	St. Catharines.....	Lincoln.
Hutton, William E.....	St. Catharines.....	Lincoln.
Harvard, Benjamin.....	Merthyr Tydfil.....	Wales.
Hopkins, John H.....	Holt.....	York.
Holden, Walter L.....	Hamilton.....	Wentworth.
Jones, George B.....	Guelph.....	Wellington (Guelph City).
Jones, William S.....	Halifax.....	Nova Scotia.
Jeffs, Herbert B.....	Bond Head.....	Simcoe.
Joseph, Stewart S.....	Quebec.....	Quebec.
Kestell, Robert H.....	Simcoe.....	Norfolk.
King, John Ezra.....	Middlemarch.....	Elgin.
Law, Frank E.....	Stratford.....	Perth.
Lindsay, William David.....	Woodstock.....	Oxford.
Lindsay, Samuel George.....	Woodstock.....	Oxford.
Lough, William H.....	Clinton.....	Huron.
Luton, Edward E.....	New Sarum.....	Elgin.
Lowry, Charles E. C.....	London.....	England.
McKim, James A.....	Parker.....	Wellington.
McLeod, Martin D.....	Oak Ridges.....	York.
McPhail, Ernest.....	Toronto.....	York.
McPherson, Duncan.....	Glanworth.....	Middlesex.
McDonald, John.....	Petrolia.....	Lambton.
McNish, Charles H.....	Lyn.....	Leeds.
McKercher, William.....	Wroxeter.....	Huron.
McClennan, Daniel.....	Camerton town.....	Glengarry.
Mahony, E. C.....	Hamilton.....	Wentworth.
Major, Charles H. F.....	Croydon.....	England.
Magor, John F.....	Montreal.....	Montreal.
Morton, Francis G.....	Barrie.....	Simcoe.
Maunsell, George S.....	Ottawa.....	Carleton (Ottawa City).
Messeccar, Charles L.....	Scotland.....	Brant.
Minard, William F.....	St. Thomas.....	Elgin.
Monteith, William.....	Exeter.....	Huron.

2.—COLLEGE ROLL FOR THE SESSION 1881-'82—*Continued.*

NAME.	P. O. ADDRESS.	COUNTY, &c.
Millson, Matthew.....	Glanworth	Middlesex.
Manghan, Walter.....	Owen Sound	Grey.
Newport, Edward.....	St. George	Bermudas.
Neilson, James.....	Lyn	Leeds.
Ord, William.....	Toronto	York (Toronto City).
Pope, Edward.....	Sarawak	Grey.
Pope, Herbert.....	Sarawak	Grey.
Philbin, Thomas R.....	Ottawa	Carleton.
Pope, Alfred H.....	London	England.
Perry, Donald E.....	Ottawa	Carleton (Ottawa City).
Patterson, William.....	Merritton	Lincoln.
Ramsay, Robert H.....	Eden Mills	Wellington.
Rogers, Frederick	Deans	Haldimand.
Raynes, G. R.....	Côte St. Antoine.....	Montreal.
Ryall, Frank.....	Paris	Brant.
Raikes, Harry.....	Barrie	Simcoe.
Riddell, Alfred.....	Kimburn	Carleton.
Rennie, Ernest.....	Hamilton	Wentworth (Hamilton City)
Robinson, Jesse D.....	Middlemarch	Elgin.
Robertson, William	Wanstead	Lambton.
Routh, Rudolph	Montreal	Quebec.
Rose, George M.....	Toronto	York (Toronto City).
Shuttleworth, Arthur	Mount Albert	York.
Silverthorne, Newman	Somerville.....	Peel.
Stover, John William	Norwich	Oxford.
Shearer, Edward.....	Ottawa	Carleton (Ottawa City).
Skinner, Andrew	Woodstock	Oxford.
Smith, John A.....	Martintown	Glengarry.
Smith, J. Lloyd.....	Ottawa	Carleton (Ottawa City).
Smith, Frank W.....	Scotland	Brant.
Strange, Alexander W.....	Kingston	Frontenac.
Stephenson, Charles R.....	Fingal	Elgin.
Schwartz, Yohann A.....	Quebec	Quebec.
Tronson, Harold.....	Oakville	Halton.
Terhune, Frederick	Brantford	Brant.
Tourangeau, Adolphus	Quebec	Quebec.
Townsend, Kirkley	Aldershot	Wentworth.
Torrance, Wilfred.....	Ottawa	Carleton (Ottawa City).
Thomas, Frank J.....	Oxford	England.
White, William G.....	Lanark	Lanark.
White, Charles.....	Lanark	Lanark.
Wyndham, Walter.....	Roch's Point	York.
Wettlaufer, Frederick	Tavistock	Perth.
Williams, Albert.....	Culloden	Oxford.
Wilcocks, Frederick H.....	Richmond	Quebec.
Willis, William B.....	Whitby	Ontario.
Total.....		129

APPENDIX 2.

TIME TABLES FOR FALL TERM (1ST OCTOBER TO CHRISTMAS), 1881.

Time Table No. 1 gives the routine of the different years and divisions for the first week ; Time Table No. 2, the routine of the same years and divisions for the second week, No. 1 and No. 2 having been followed alternately, for a week each, throughout the term.

TIME TABLE No. 1.—1st WEEK.

2ND YEAR.

Forenoon.	Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
	7-12	Work.	Work.	Work.	Work.	Work.	Work.
Afternoon.	2-3	Agricultural Chemistry.	Levelling and Surveying.	Handling and Judging Cattle or Sheep.	Meteorology.	Agricultural Chemistry.	Half Holiday.
	3-4	Veterinary Pathology.	Agriculture.	Agricultural Chemistry.	Agriculture.	English Literature.	
	4-5	Handling and Judging Horses.	English Literature.	Statics.	Levelling and Surveying.	Veterinary Pathology.	

1ST YEAR—DIVISION I.

Forenoon.	Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
	7-12	Work.	Work.	Work.	Work.	Work.	Work.
Afternoon.	2-3	Arithmetic.	English Composition.	Natural History.	Natural History.	Arithmetic.	Half Holiday.
	3-4	Agriculture.	English Literature.	Agriculture.	Inorganic Chemistry.	Inorganic Chemistry.	
	4-5	Inorganic Chemistry.	Veterinary Anatomy.	Veterinary Anatomy.	English Literature.	Agriculture.	

1ST YEAR—DIVISION II.

	Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Forenoon.	7-8	Study or Recreation.	Study or Recreation.	Study or Recreation.	Study or Recreation.	Study or Recreation.	Half Holiday.
	8-9	Drill or Gymnastics.	Drill or Gymnastics.	Drill or Gymnastics.	Drill or Gymnastics.	Drill or Gymnastics.	
	9-10	Arithmetic.	Arithmetic.	Natural History.	English Composition.	English Literature.	
	10-11	Inorganic Chemistry.	Agriculture.	Inorganic Chemistry.	English Literature.	Agriculture.	
	11-12	Natural History.	Inorganic Chemistry.	Veterinary Anatomy.	Agriculture.	Veterinary Anatomy.	
After-noon.	1.30-5	Work.	Work.	Work.	Work.	Work.	Work.

TIME TABLE No. 2.—2ND WEEK.

2ND YEAR.

	Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Forenoon.	7-8	Study or Recreation.	Study or Recreation.	Study or Recreation.	Study or Recreation.	Study or Recreation.	Half Holiday.
	8-9	Drill.	Drill.	Drill.	Drill.	Drill.	
	9-10	Agricultural Chemistry.	Levelling and Surveying.	Handling and Judging Cattle or Sheep.	Meteorology.	Agricultural Chemistry.	
	10-11	Veterinary Pathology.	Agriculture.	Agricultural Chemistry.	Agriculture.	English Literature.	
	11-12	Handling and Judging Horses.	English Literature.	Statics.	Levelling and Surveying.	Veterinary Pathology.	
After-noon.	1.30-5	Work.	Work.	Work.	Work.	Work.	Work.

1ST YEAR.—DIVISION I.

	Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Forenoon.	7-8	Study or Recreation.	Study or Recreation.	Study or Recreation.	Study or Recreation.	Study or Recreation.	Half Holiday.
	8-9	Drill or Gymnastics.	Drill or Gymnastics.	Drill or Gymnastics.	Drill or Gymnastics.	Drill or Gymnastics.	
	9-10	Arithmetic.	English Composition.	Natural History.	Natural History.	Arithmetic.	
	10-11	Agriculture.	English Literature.	Agriculture.	Inorganic Chemistry.	Inorganic Chemistry.	
	11-12	Inorganic Chemistry.	Veterinary Anatomy.	Veterinary Anatomy.	English Literature.	Agriculture.	
Afternoon.	1.30-5	Work.	Work.	Work.	Work.	Work.	Work.

1ST YEAR.—DIVISION II.

	Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Forenoon.	7-12	Work.	Work.	Work.	Work.	Work.	Half Holiday.
Afternoon.	2-3	Arithmetic.	Arithmetic.	Natural History.	English Composition.	English Literature.	
	3-4	Inorganic Chemistry.	Agriculture.	Inorganic Chemistry.	English Literature.	Agriculture.	
	4-5	Natural History.	Inorganic Chemistry.	Veterinary Anatomy.	Agriculture.	Veterinary Anatomy.	

TIME TABLE No. 3.—SPECIAL COURSE.

1ST YEAR.—SPECIAL.

	Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Forenoon.	7-8	Work.	Work.	Work.	Work.	Work.	Work.
	9-10	Arithmetic.	Arithmetic.	Natural History.	English Composition.	English Literature.	Holiday.
	10-11	Inorganic Chemistry.	Agriculture.	Inorganic Chemistry.	English Literature.	Agriculture.	
	11-12	Natural History.	Inorganic Chemistry.	Veterinary Anatomy.	Agriculture.	Veterinary Anatomy.	
Afternoon.	2-3	Study.	Study.	Study.	Study.	Study.	
	3-4	Book-keeping.	Geology and Phys. Geog.	Botany.	Veterinary Mat. Med.	Study.	
	4-5	Mensuration.	Agriculture.	Study.	Agriculture.	Geology and Phys. Geo.	

2ND YEAR.—SPECIAL.

	Hours.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Forenoon.	7-8	Work.	Work.	Work.	Work.	Work.	Work.
	9-10	Agricultural Chemistry.	Levelling and Surveying.	Statics.	Meteorology.	Agricultural Chemistry.	Holiday.
	10-11	Veterinary Pathology.	Agriculture.	Agricultural Chemistry.	Agriculture.	English.	
	11-12	Handling and Judging Horses.	English.	Handling and Judging Cattle or Sheep.	Levelling and Surveying.	Veterinary Anatomy.	
Afternoon.	2-3	Study.	Economic Botany.	Agriculture.	English.	Study.	
	3-4	Book-keeping.	Dynamics.	Study.	Study.	Practical Chemistry.	
	4-5	Study.	Veterinary Mat. Medica.	Practical Chemistry.	Economic Botany.	Practical Chemistry.	

APPENDIX 3.

ONTARIO AGRICULTURAL COLLEGE

EXAMINATION PAPERS.

- I. PAPERS SET AT THE SESSIONAL EXAMINATIONS, EASTER, 1881.
- II. PAPERS SET AT THE SESSIONAL EXAMINATIONS, JUNE, 1881.
- III. PAPERS SET AT THE MATRICULATION EXAMINATIONS, OCTOBER, 1881.

I. PAPERS SET AT THE SESSIONAL EXAMINATIONS, EASTER, 1881.

FIRST YEAR.

AGRICULTURE.

Examiner: WM BROWN.

1. Give a comprehensive sketch of what characterises the different kinds of farming called grazing, dairying and mixed.

2. What guides us in concluding that a soil requires to be drained, and how is drainage in all its details most efficiently conducted under two of the most opposite conditions?

3. State what is meant by "injudicious combination of material" in fence building, and explain the terms "severance damages," "catch water drain," and "gradient" in connection with road making.

FIRST YEAR.

LIVE STOCK.

Examiner: WM. BROWN.

1. Give brief notes on the history of the Shorthorn and Angus or Aberdeen Polled breeds of cattle.

2. Draft a pedigree to the fifth dam.

3. Compare the Galloway and Angus or Aberdeen Polled breeds in all their similar and dissimilar points and characteristics.

4. Compare points and characteristics of the Southdown and Oxford Down breeds of sheep.

5. How should wool be judged in all respects?

EASTER EXAMINATIONS, 1881—continued.

FIRST YEAR.

PRACTICAL EXAMINATION IN LIVE STOCK.

Examiner: WM. BROWN.

CATTLE—

1. Show the best and the poorest points of the youngest steer, judging by a Short-horn standard.
2. Describe the whole get-up of the other steer, from any point of comparison.
3. Name the breeding of the cows, and show wherein the one indicates superior milking properties to the other.

FIRST YEAR.

PRACTICAL EXAMINATION IN LIVE STOCK.

Examiner: WM. BROWN.

SHEEP—

1. Point out and name the different breeds, crosses and grades.
2. Which is the best woolled sheep, as regards uniformity and soundness?
3. How would you breed from among these, in order to secure as near as possible the wool of the Merino, with the carcass of the Leicester and constitution of the South-down—giving reasons in detail?

FIRST YEAR.

INORGANIC CHEMISTRY.

Examiner: J. HOYES PANTON, M.A.

1. Name the different ways in which heat may be transmitted, and give examples of each.
2. Explain the terms base, atom, salt, latent heat.
3. Give the preparation and properties of *choke damp* and *fire damp*.
4. What is meant by a formula in chemistry? Give the formulas for the three *nitriols*, and distinguish these compounds from each other.
5. Name three metals lighter than water, and give their properties.
6. Write notes on the compounds represented by Ca CO_3 , H N O_3 , N H_3 , Na H C O_3 , with reference to their source and utility.
7. Give the preparation and properties of nitrogen.
8. Name the different forms in which *silica* and *alumina* occur, and give their use.
9. Describe a lamp flame, and explain the action of the Bunsen burner.

FIRST YEAR.

ORGANIC CHEMISTRY.

Examiner: J. HOYES PANTON, M.A.

1. Contrast organic compounds with inorganic, and explain the terms carbohydrates, hydrocarbons, alcohols, as applied to chemical compounds.
2. Name the products which can be obtained from petroleum, and the uses for which they are employed. Explain the cause of explosions in kerosene lamps.
3. Give notes on glycerine, cellulose, and the products which can be derived from them.

EASTER EXAMINATIONS, 1881—continued.

4. Distinguish tartaric acid from oxalic. Give the uses of each, and the sources from which these acids are derived.
5. Name some compounds occurring in the group Perpenes, and state a peculiarity existing in the compounds of this group.
6. Write notes on linseed oil, opium, urea and nicotine.
7. Name some of the most important chemical compounds which occur in the juice of the beet, the cane, and the grape.
8. Describe Daniell's battery, and name some of the best conductors of electricity.
9. Upon what chemical principle does the preparation of soap depend?

FIRST YEAR.

ZOOLOGY.

Examiner: JAMES MILLS, M.A.

1. Distinguish organic from inorganic bodies, and state to what extent organization is a condition of life.
2. Explain what is meant by a species. How would you proceed to determine whether *Merino* and *Cotswold* sheep belong to the same species or not?
3. What is taken as the basis of a natural classification of animals? Illustrate.
4. Contrast the two great sections of the animal kingdom—*Vertebrata* and *Invertebrata*.
5. Name the sub-kingdoms of invertebrates, and write as full a description as you can of some two of them.
6. Tell briefly and clearly what you know about frogs, silk-moths, lobsters, and sponges.
7. Describe each of the three stages in the life of a butterfly.
8. Compare an *insect* with a *spider*.
9. Give the classes of vertebrates and the orders of mammals.
10. Name the sub-kingdom, the class and (where you can) the order to which each of the following belong:—Mouse, cat, ox, horse, sheep, pig, oyster, lobster, bee, goose, salmon, leech, star-fish, whale.

FIRST YEAR.

VETERINARY ANATOMY.

Examiner: E. A. A. GRANGE, V.S.

1. Name the various processes of digestion, and state where each process is performed.
2. Name the structures entering into the formation of the foot.
3. Describe the hoof of the horse.
4. Name the structures entering into the formation of a joint.
5. Name the organs of respiration, and state what change takes place in the blood in the lungs.
6. Describe the course of the circulation of the blood through the heart and lungs.
7. Describe the difference between the preparatory organs of digestion of the horse and ox, taking the horse as the standard.
8. Describe the changes which take place in the incisor teeth from birth to eight years old of the horse.
9. Name the compartments which the stomach of the ox is divided into, and describe the appearance of the internal coat of each compartment.
10. Name the bones of the hind extremity of the ox.

EASTER EXAMINATIONS, 1881—continued.

FIRST YEAR.

ENGLISH COMPOSITION.

Examiner: JAMES MILLS, M. A.

1. Explain what is meant by style, and what you consider the essential properties of a good style.
2. State fully what is comprehended under the heads of *accuracy* and *clearness*.
3. Write an article on the peculiarities of poetic diction.
4. Write a composition on one of the following subjects :
 - (1.) Climate.
 - (2.) Sheep-farming in Canada.
 - (3.) System, order and tidiness in farming.
 - (4.) "Who o'er the herd would wish to reign,
 Fantastic, fickle, fierce and vain !
 Vain as the leaf upon the stream,
 And fickle as a changeful dream ;
 Fantastic as a woman's mood,
 And fierce as Frenzy's fevered blood."

FIRST YEAR.

ENGLISH LITERATURE: SCOTT'S "LADY OF THE LAKE."

Examiner: JAMES MILLS, M. A.

1. Write an article on the leading peculiarities of the literature of the first half of the present century.
2. State when Scott was born, where he lived, and when he died ; also name six of his most noted contemporaries.
3. Write a short composition on the "Lady of the Lake,"—the plot, incidents, style, metre, etc.
4. Write a summary of Canto V.
5. Give the meaning and derivation of *sullen*, *caitiff*, *pallet*, *bugle*, *bulwark*, *atone*.
6. "The chief in silence strode before,
 And reached the torrent's sounding shore,
 Which, *daughter* of three mighty lakes,
 From Vennachar in silver breaks,
 Sweeps through the plain, and ceaseless *mines*,
 On Bochartle the mouldering lines,
 Where Rome, the Empress of the world,
 Of *yore* her eagle wings unfurled :
 And here his course the Chieftain staid,
 Threw down his target and his plaid,
 And to the Lowland warrior said :—
 'Bold Saxon ! to his promise *just*,
 Vich-Alpine has discharged his trust.
 This murderous Chief, this ruthless man,
 This head of a rebellious clan,
 Hath led thee safe through watch and ward,
 Far past Clan-Alpine's outmost guard.
 Now, *man* to *man*, and steel to steel,
 A Chieftain's vengeance thou shalt feel.'"

EASTER EXAMINATIONS, 1881—continued.

- (a) Comment on the description.
- (b) Explain the construction of the italicised words.
- (c) "*Three mighty lakes*"—name the lakes, and draw a map showing the position of *Katrine, Achray, Vennachar, Benledi, Forth, Teith* and *Stirling*.
- (d) "*Eagle wings*"—what is referred to?
- (e) "*Has discharged his trust*"—explain the allusion.
- (f) Point out the figures in the above extract.

7. Scan the following :

"O, Alice Brand, my native land
Is lost for love of you ;
And we must hold by wood and wold,
As outlaws wont to do."

8. "~~He~~ rights such wrongs," etc.

"I'll listen till my fancy hears," etc.

"Sad was thy lot on mortal stage," etc.

Complete the quotations.

FIRST YEAR.

ARITHMETIC.

Examiner : A. A. MACTAVISH.

1. Determine the profits from Field No. 10 (10 acres) from the following Ledger account :

(*See next page.*)

Cr.

FIELD No. 10 (10 acres).

Dr.

Month.	Day.	—	%	cts.	Month.	Day.	—	%	cts.
1879.					1879.				
October	15	To 150 loads B. Y. manure, at \$1.55 per load..			December	20	By 220 bushels, at \$1.05		
"	28	" 10 days' ploughing, at \$2.00					" 18 tons straw, at \$3.25		
1880.							Four-fifths manure (unexhausted)		
April	18	" 3 " gang ploughing, at 1.50							
"	19	" 15 bushels spring wheat, at \$1.25							
"	19	" 1 day's seeding, at \$1.00							
"	20	" 2 " harrowing, at \$1.25							
August	10	" 1 " reaping, at \$5.00							
"	10	" 3 " binding, at \$1.50							
"	14	" 1 " drawing in grain, at \$6.00							
October	23	" threshing 220 bushels, at 7 cts							
December	20	" marketing 220 bushels, at 3 cts							

EASTER EXAMINATIONS, 1881—continued.

2. Find the length in perches of a square field containing 40 acres.
3. James Wilson and John Hunter buy a sawing machine, for which they pay \$300 and \$200 respectively. It works five months for each of them. Determine what one must pay the other, if they would have made 30 per cent. on the money by letting the machine.
4. A farmer bought a horse for a bill of \$150, due in one month, and sold him for a bill of \$175, due in four months. What did he gain per cent., money being worth 10 per cent.?
5. Bought at the Bow Park sale, one Shorthorn heifer calf for \$75, five Leicester ewes at \$35 each, and three Southdown ewes at \$30 each. Terms of sale, eight months' credit, or discount for cash at the rate of 6 per cent. per annum. What cash was paid?
6. Bought from William Lyons, Philadelphia, a Percheron stallion, and sold him to James Lowell, Toronto, at a loss of 5 per cent. Had I sold him for \$125 more I would have gained 5 per cent. Find how much was paid for him in Philadelphia, duty on horses being 25 per cent.
7. *A*, *B* and *C* were employed to hoe a corn-field for \$6.70. *A* could hoe a row in four-fifths of an hour, *B* in three-sevenths of an hour, and *C* in half an hour. It so happened that when all first came to the end of a row at the same instant the work was completed. Divide the money fairly among them, and find the number of rows hoed by each.
8. A merchant in London is indebted to one at St. Petersburg 15,000 roubles. The exchange between St. Petersburg and England is 50 pence per rouble, between St. Petersburg and Amsterdam 91 pence per rouble, and between Amsterdam and London 36 shillings and 3 pence per sterling. Which will be the most advantageous way for the London merchant to be drawn upon?
9. I invest \$1,000 of Imperial Bank stock quoted at 105 in Toronto Bank stock quoted at 136. What amount of the latter do I receive?

FIRST YEAR.

BOOK-KEEPING.

Examiner: A. A. MACTAVISH.

1. Put in their proper place, in your Farm Book, the following memoranda, and close the two individual accounts:—January 8, bought of William McGregor, blacksmith, 1 lumber sleigh, \$28, and he also shod my horses for \$1. February 8, John Lyoll has cut for me 8 cords of wood, at 38c. per cord. Same day I sold him 2 bushels of wheat, at \$1.12 per bushel, and 20½ pounds of pork, at 8c. per pound. February 9, blacksmith set 1 shoe, 13c. March 1, Lyoll has sawed for me 3 days, ended this day, at 75c. per day. April 1, I sold him 1 bushel of corn, at 63c.; also ½ bushel of beans, at \$1 per bushel. April 8, he has worked 4 days, drawing manure, ending to-day, at 75c. per day. April 15, blacksmith made me 1 large clevis for \$1. May 1, he made 2 hoes for me, at 50c. each. May 8, sold Lyoll a pig for \$75, and ploughed his garden for 75c. May 29, he has worked for me 2 days, hoeing corn, at 75c. per day. June 7, sold him 3 yards gray cloth, at 75c. per yard, and paid him \$3 in cash. June 8, blacksmith shod my horses for \$1.75, sharpened a colter for 13c., and mended a chain for 13c. July 24, Lyoll has worked for me 3 days, haying, at \$1 per day. August 5, blacksmith set waggon tire for me, \$1; sold him 1 ton of hay, \$8. August 12, Lyoll has worked for me 5 days, harvesting, at \$1.50 per day. September 9, I have pastured Lyoll's cow for 4 weeks, ending to-day, at 25c. per week. Blacksmith ironed whiffletrees for me to-day, \$1.50. October 9, sold him 5 cords of wood, at \$2 per cord. Lyoll has worked for me 2 days, threshing, at 88c. per day. November 11, Lyoll has husked corn for me 2 days, at 75c. per day. Sold the blacksmith 4 bushels of wheat at \$1.12 per bushel, 16 bushels

EASTER EXAMINATIONS, 1881—continued.

of oats at 38c. per bushel, and 3 bushels of corn at 62c. per bushel. November 18, bought of him 14 pounds of gate hinges at 13c. per pound; worked for him this day with team, \$1.50. November 19, sold Lyoll 4 pounds of butter at 13c. per pound.

2. Sold James Holmes stock to the amount of \$650. Received in payment P. Almy's note for \$300, and cash for the balance. Show what ledger accounts are affected, and in what manner, by the above transaction. Give a practical form of P. Almy's note.

3. Write a time draft; a joint note; a receipt for rent.

SECOND YEAR.

AGRICULTURE.

Examiner: WM. BROWN.

1. Give a complete summary of the manner in which natural and artificial permanent pastures may be improved and maintained, with the kinds and quantities of grasses and clovers per acre that can be relied upon in the latter case in Ontario.
2. Draft a diary from 1st October, 1879, to 1st July, 1881, showing the principal events that occur in the management of 100 ewes, with the names, ages, and probable number at end of the period.
3. Show, in concise tabular form, what items usually go to make the cost of 60 lbs. of wheat and 100 lbs. of beef.

SECOND YEAR.

LIVE STOCK.

Examiner: WM. BROWN.

1. Make a "general purpose cow," naming every possible detail, and specify to what particular breed or combination of breeds she would be comparable. Use the following form:—

POINTS.	Description of Points.	Similar to average breed or breeds called—

2. Make a model ram, having medium length of wool, and all the detail points of carcass and wool best calculated to ensure success:—

POINTS.	Description of Carcass Points.	Description of Wool Points.	Similar to average breed or breeds called—

EASTER EXAMINATIONS, 1881—continued.

SECOND YEAR.

PRACTICAL EXAMINATION IN LIVE STOCK.

Examiner: WM. BROWN.

CATTLE—

1. Show wherein the steer is defective as, and wherein equal to, a standard Shorthorn.

2. Judge the cows, and decide upon their comparative merits as regards beefing and milking indications, without reference to breed.

3. In order to secure as much quantity and quality of milk as possible, and afterwards have the best possible stamp of animal for rapid beef making, in quantity and quality, which bull and cow would you mate for these purposes, having regard to the known characteristics of breed as well as the individual points of each animal? Give your reasons in detail.

SECOND YEAR.

PRACTICAL EXAMINATION IN LIVE STOCK.

Examiner: WM. BROWN.

SHEEP—

1. Which is the most even-fleshed wether, and wherein does it differ from the Leicester standard in carcass points?

2. Which is the best woolled ewe as regards uniformity and lustre?

3. Having regard to the known characteristics of kinds, with what would you breed, from among this lot, in order to secure the greatest amount of the best quality of flesh and wool in the shortest time? Explain reasons for your decision.

SECOND YEAR.

ARBORICULTURE.

Examiner: WM. BROWN.

The object of conserving our present forests and replanting other parts of the country being—

1. To afford shelter for crops.
2. Shelter for grazing animals.
3. Shelter for dwellings.
4. Regulation of temperature.
5. Regulation of rainfall.
6. Securing ornament.
7. A direct cropping investment.

Write short comprehensive notes on each, showing by practical facts what we want and how we should meet these wants.

SECOND YEAR.

AGRICULTURAL CHEMISTRY.

Examiner: J. HOYES PANTON, M.A.

1. Name the principal compounds which afford food for plants, and state what changes they undergo before they are taken up by the plants.

EASTER EXAMINATIONS, 1881—continued.

2. Describe clay, sand and swamp earth, with reference to chemical composition, physical characters and origin.

3. Contrast the soil of Western Ontario with that of Muskoka, and account for the difference in chemical composition.

4. Under what circumstances would you recommend the application of sodic nitrate, superphosphate of lime and quicklime to land? Give the composition of each of these compounds.

5. State the changes which vegetable matter undergoes during decomposition, and give the chemical uses of the *muck* of swamps.

6. How are manures valued? Give an example illustrating your answer.

7. State what ingredients may be expected from an analysis of the ash of plants? Name the organic constituents which are found in plants.

8. What constituents are sought for in the analysis of foods? Give their use in the animal economy.

9. By what means can the feeding properties of foods be largely increased? Illustrate by an example.

10. By what reagents are sugar and fat acted upon in the bodies of animals?

SECOND YEAR.

ENTOMOLOGY.

Examiner: J. HOYES PANTON, M.A.

1. Define an insect, and describe the circulatory and respiratory organs of insects.

2. Compare the Hessian fly with the wheat midge.

3. Give notes on the Ichneumonidae, and Phylloxera Vastatrix.

4. What plants are affected by Anisopteryx vernata, Eudryas grata, Selandria cerasi, Haltica chalybea, Telea polyphemus, Aegeria tipuliformis, Pieris rapæ, Caloptenus spretus, Agrotis messoreia, Leucania unipuncta?

Give the names commonly applied to these insects, and name the orders to which they respectively belong.

5. Name the families to which some of the most beneficial insects belong.

6. Give the remedies for the prevention of ravages by the plant-louse, the borer, the currant-worm, and the joint worm.

7. Name the insects injurious to the apple, and give the orders to which they respectively belong.

8. Name the insects belonging to the order Hemiptera injurious to vegetation.

9. Identify the specimens before you, and name the plants affected by them. Give remedies for the first.

SECOND YEAR.

METEOROLOGY.

Examiner: J. HOYES PANTON, M.A.

1. Explain what is meant by atmospheric pressure. How is this ascertained? What changes would require to be made in a barometer if glycerine was used instead of mercury?

2. Describe the following instruments, and state the uses for which they are employed:—Pluviometer, Aneroid Barometer, and Minimum Thermometer.

3. Explain what is meant by the correction in the Barometer for gravitation. What is a weather map? How is it constructed?

EASTER EXAMINATIONS, 1881—continued.

4. What effect has a large swamp on the temperature of places in the vicinity? State conditions which affect the moisture of the air.

5. How do you account for the fact that plants and trees situated in the bottom of a valley suffer much more from cold and frost than those in a higher situation?

6. What are *obscure heat rays*? "The mean temperature of a place gives little or no idea of its climate, or of the forms of life for which it is fitted." Explain this remark.

7. What effect has the Rocky Mountains on the climate and vegetation of America?

8. What is meant by the rainfall of a place? How is it affected, and in what way can it be ascertained?

9. Read the instruments before you.

SECOND YEAR.

HORTICULTURE.

Examiner: JAMES FORSYTH.

1. Describe how hybridizing takes place naturally, how it may be accomplished artificially, and how hybridized varieties are perpetuated.

2. Describe the usual mode of propagating greenhouse plants, the material necessary, and the temperature required.

3. In the collection of plants before you, name—

(a) The monœcious plants.

(b) Those with perfect flowers.

(c) Those with endogenous stems.

4. Describe a soil suitable for potting a large number of greenhouse plants.

5. What is a double flower, and wherein does it differ from a single flower of the same species?

6. Make a selection of six plants suitable for window culture, giving the common and the scientific name of each.

7. Name four insects which commonly attack greenhouse plants, and state how they may be destroyed.

8. Identify the plants before you, giving the common and the scientific name of each—

(a) Name the orders to which they respectively belong.

(b) Describe fully plants 2 and 5.

SECOND YEAR.

HORSE PATHOLOGY.

Examiner: E. A. A. GRANGE, V.S.

1. Name the terminations and symptoms of Inflammation.

2. Name all the diseases in connection with the Hock.

3. " " " " " Foot.

4. Describe the difference in symptoms of Ringbone in the front and hind foot.

5. Describe the causes, symptoms and treatment of Azoturia.

6. Name the various kinds of Fracture.

7. Describe the various ways for testing a horse for Bone Spavin.

8. Describe the nature, causes, symptoms and treatment of Catarrh.

9. " " " " " " " Laminitis.

10. " " " " " " " Enteritis.

EASTER EXAMINATIONS, 1881—continued.

SECOND YEAR.

CATTLE PATHOLOGY.

Examiner : E. A. A. GRANGE, V.S.

- 1. Name the diseases peculiar to the bones of the ox.
- 2. Describe the symptoms and causes of a disease termed dentition fever.
- 3. Describe the nature, causes and symptoms of flukes in sheep.
- 4. " " " " sturdy in sheep.
- 5. Name the diseases peculiar to the digestive organs.
- 6. Describe the causes, symptoms and treatment of Tuberculosis.
- 7. Describe the nature, causes, symptoms and treatment of Hoven.
- 8. " " " " " Impaction of Rumen.
- 9. " " " " " Parturient Apoplexy.
- 10. " " " " " Foot and Mouth Disease.

SECOND YEAR.

ENGLISH COMPOSITION.

Examiner : JAMES MILLS, M.A.

Write a composition on one of the following subjects :—

- 1. Canada as a field for stock-raising.
- 2. The effects of climate on the productions, industries, and inhabitants of a country.
- 4. "There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune ;
Omitted, all the voyage of their life
Is bound in shallows and in miseries."

SECOND YEAR.

SHAKSPEARE'S JULIUS CÆSAR.

Examiner : JAMES MILLS, M.A.

- 1. Name Shakspeare's Roman plays, and give briefly the argument of *Julius Cæsar*.
- 2. Name the members of the second triumvirate, and write a short account of each.
- 3. Explain the connection and meaning of the following :—
 - (a) "—————Vexed I am
Of late, with passions of some difference,
Conceptions only proper to myself,
Which give some soil, perhaps, to my behaviors."
 - (b) "Be factious for redress of all these griefs."
 - (c) "And nature must obey necessity,
Which we will niggard with a little rest."
 - (d) "Why I will see thee at Philippi, then —
Now I have taken heart thou vanishest."
 - (e) "His life was gentle ; and the elements
So mixed in him, that nature might stand up,
And say to all the world, 'This was a man.'"

EASTER EXAMINATIONS, 1881—continued.

4. Derive *rheumy, lief, brooked, fantasies, fain, alchemy*.
5. What is peculiar in Shakspeare's use of the words *temper, his, jealous, an* and *proper*?
6. Write an article on the Elizabethan period of English Literature.
 - (a) In speaking of the Elizabethan English, Todd says that "every variety of apparent grammatical inaccuracy meets us." Account for this fact, and illustrate by quotations from *Julius Caesar*.
7. Criticise the following, illustrating at length by quotations and comments:—
 - (a) "Then to the well-trod stage anon,
If Jonson's learned sock be on;
Or sweetest Shakspeare, Fancy's child,
Warble his native wood-notes wild."—*Milton*.
 - (b) "Apart altogether from his dramatic power, he [Shakspeare] is the greatest poet that ever lived. His sympathy is the most universal, his imagination the most plastic, his diction the most expressive ever given to any writer.—*Craik*.
 - (c) "The contrast between the weakness of Cæsar's bodily presence in the first half of the play, and the might of his spiritual presence in the latter half of the play, is emphasized, and perhaps over-emphasized by Shakspeare."—*Dowden*.
8. Quote what you consider the finest passages in the play.

SECOND YEAR.

POLITICAL ECONOMY.

Examiner: JAMES MILLS, M.A.

1. Discuss and illustrate the nature of wealth, and the several agents of production.
2. State fully the advantages and disadvantages said to result from the division of labour.
3. Summarize Professor Jevons' chapter on the "Distribution of Wealth."
4. Investigate the relation between wages and labour, so as to discover the causes of high and low wages.
 - (a) Examine the various methods adopted to regulate the rate of wages and show their economic effects.
5. Compare the Irish and the Canadian system of land tenure, enumerating the advantages and disadvantages of each.
6. Why are gold and silver so much used for money in preference to other materials?
7. "*The market price will be such that the demand at that price will equal the supply at that price.*" Explain and illustrate the meaning of this statement.
8. Discuss—
 - (1) The question of temporary protection in a new country.
 - (2) Adam Smith's maxims of taxation.
 - (3) The influence of credit on the prosperity of a community.
 - (4) Nihilism and Socialism.

EASTER EXAMINATIONS, 1881—continued.

SECOND YEAR.

APPLIED MECHANICS.

Examiner: A. A. MACTAVISH.

1. A barn door is 12 ft. long, 6 ft. wide, and weighs 160 pounds. If the hinges be 9 ft. apart, determine the stress on the upper hinge, and also the thrust against the lower one. Give a diagram of a barn door properly braced?

2. To a beam A B 8 ft. long, a system of five movable pulleys (where each pulley hangs by a separate cord) is attached. With such a system what power will raise 12 bushels of wheat?

3. (*See Q. 2.*) A B is 8 ft. long and weighs 40 pounds. The cords of the system are attached to it at intervals of 1 foot; the one suspending the fixed pulley being 2 ft. from end B. The power and weight are in equilibrium. How far from the end A must a fulcrum be placed that A B may come to rest in a horizontal position?

4. Show by a diagram how you would determine the draft of a field roller. What objection is there to increasing its weight by piling stone on the frame work? Contrast the merits of a large diametered with that of a small diametered roller of equal weight.

5. Write very brief notes on the following:—

(a) Testing a swing plough, properly adjusted.

(b) The position of coulter in a sod plough.

(c) The width of shear in a sod plough.

(d) Adjusting a plough which tends to run inland.

(e) Adjusting a plough which tends to run deeper.

(f) The ratio of width of furrow to depth of furrow, that the sod may ultimately rest at an angle of 45° to the plane.

6. In our ordinary farm carts the length of the shaft (from centre of axle to the back-band chain) is 8 ft. Now, suppose that when the load is one ton, the shafts are horizontal, and the C. of G. of load is vertically over the axle, at a distance of 2 ft. from it; then the pressure on the horse's back is 0. But if the horse is descending a hill of 30° inclination, and the load is held back by the breech-band, then the pressure on his back is $\frac{2000 \times 1}{4 \times 3}$ or 389 pounds. Show by a diagram how the numbers in this calculation are obtained. What improvement would you suggest in the form of the axle to prevent a possibility of such a pressure?

7. Which is the greater work, reaping a ten acre field, draft of reaper being 200 lbs. and length of knife being 5 ft.; or ploughing an acre of land when draft of plough is 312 lbs. and width of furrow being 8 inches?

HYDROSTATICS.

8. Draw diagrams to illustrate the following:—(a) Hydraulic Press, (b) Suction pump, (c) Forcing pump, and write brief notes to explain the manner of their working.

9. Explain fully the manner in which the Hydraulic Ram works.

10. How would you find the pressure on one side of a submerged flood-gate?

SECOND YEAR.

LEVELLING.

Examiner: A. A. MACTAVISH.

1. Draw a full-sized one foot division of the levelling staff.

2. Distinguish between the true and apparent level.

JUNE EXAMINATIONS, 1881.

3. Complete the following field book :—

	BACK SIGHT.	FORE SIGHT.	Peg	1.	Distance	100 feet.
A	5.36	3.04	"	2.	"	100 "
	7.02	9.35	"	3.	"	100 "
	4.05	6.36	"	4.	"	100 "
	2.12	3.96	B		"	50 "
	4.08	3.00				

4. A road is made from A to B, find rise in grade per 100 feet.

DRAINAGE.

5. Enumerate the signs exhibited by under-drained lands.
6. Enumerate the benefits arising from thorough drainage.
7. On drained lands the time of seeding is earlier than on undrained lands. Explain fully why this is the case.
8. Write briefly on "Depth and Distance apart of Drains."

ROAD MAKING.

9. Draw a transverse section of a properly built meadow road (let your diagram represent a section extending from fence to fence). Write brief notes on the various parts of the section.

10. Explain how you would determine the force with which a team would have to pull, drawing a load of a given weight up a grade of a given rise, and on which the friction is 1-30th of load.

11. Enumerate the causes of injury to roads.
12. Comment briefly on the present road-making laws of Ontario.

II. PAPERS SET AT THE SESSIONAL EXAMINATIONS, JUNE, 1881.

FIRST YEAR.

AGRICULTURE.

Examiner: WM. BROWN.

1. Classify, and judge in every detail, the accompanying sample of barley.
2. What are the characteristics, special properties, and the usual practice in the use of mineral superphosphates, gypsum, bone dust, and farmyard manure?
3. Give a concise sketch of the usual mode of cultivating: (1) a cereal; (2) a root; (3) a soiling crop; (4) a tuber.
4. What is comprehended under the term "tillage operations," and to what class of crops are their thorough application indispensable?
5. Sketch the history, arrangement, and condition of our No. — Field.

JUNE EXAMINATIONS, 1881—continued.

FIRST YEAR.

STRUCTURAL BOTANY.

Examiner: J. HOYES PANTON, M.A.

1. Compare the earlier stages of growth in the maple, lily and pine.
2. "Roots may be considered with reference to duration and shape." Illustrate this by giving examples.
3. Contrast the stem of the Indian corn with that of the flax, and give the characteristics of the embryo leaves and flowers of plants represented by these types.
4. Explain the terms tuber, bulb, prickle, monoëcious, culm, stolon and rootstock. Give an example of each.
5. Give diagrams illustrating the different forms of inflorescence.
6. What peculiarity is observed in the flowers of the pine, willow and red maple?
7. State the modifications sometimes observed in the stamens of a flower, and name the terms applied to such.
8. Classify dry fruits.
9. "The parts of a flower answer to leaves." Explain this remark.

FIRST YEAR.

GEOLOGY.

Examiner: J. HOYES PANTON, M.A.

1. Name the chief constituents found in the soil of the Farm, and state the sources from which they have been derived. In what period of Geological History were the present physical features of our country largely produced?
2. Give the characteristics of metamorphic rocks, and name localities where they abound. What economic products are usually found in such rocks?
3. Explain the origin of the *shell marl* in swamps.
4. Name the different forms in which fossils are found, and describe two fossils of importance, in reference to coal deposits.
5. What periods are distinguished for economic deposits? Describe what is sometimes termed the "Age of Fishes."
6. Name the geological districts of Manitoba, and describe the third area.
7. Describe the "Coal Measures." Name localities where they occur in the Dominion. How are they supposed to have been formed?
8. Name the principal fossils of the Guelph Formation.
9. The blocks placed before you represent the various periods in Geology; arrange them in their relative positions as part of the earth's crust.
10. Identify the specimens before you.

FIRST YEAR.

MATERIA MEDICA.

Examiner: E. A. A. GRANGE, V.S.

1. What is a purgative?
2. What is the best purgative for the horse?
3. Name the most important varieties of aloes.
4. Give the nature, action and uses of Barbadoes aloes.

JUNE EXAMINATIONS, 1881—continued.

5. What is the dose of Barbadoes aloes as a purgative for the horse?
6. What length of time does it take an ordinary purgative of aloes to act in the horse?
7. Name the best purgative for each of the domestic animals.
8. Name classes Tonics are divided into, and give an example of each class.

FIRST YEAR.

ENGLISH LITERATURE.

GOLDSMITH'S "DESERTED VILLAGE."

Examiner: JAMES MILLS, M.A.

Sweet, smiling village, loveliest of the lawn,
 Thy sports are fled, and all thy charms withdrawn;
 Amidst thy bowers the tyrant's hand is seen,
 And desolation saddens all the green:
 One only master grasps the whole domain,
 And half a tillage stints thy smiling plain.
 No more thy glassy brook reflects the day,
 But choked with sedges, works its weary way;
 Along the glades, a solitary guest,
 The hollow-sounding bittern guards its nest.

1. Point out the figures of speech in this extract.
2. *Sweet, smiling village.* Was it an English or an Irish village? Give reasons for answer.
3. *Loveliest of the lawn.* Meaning of lawn. Derivation and other meanings.
4. Enumerate the sports and charms alluded to in second line of extract.
5. *The tyrant's hand is seen.* What does the poet refer to?
6. Give the meaning and derivation of *village, domain, stints, sedges, glades, bittern.*
7. Quote from the "Deserted Village" one example each of *metaphor, simile, assonance, metonymy.*
8. "Sunk are thy bowers in shapeless ruin all." Parse all the words in this line.
9. Quote as follows:

(a) Goldsmith's eulogy on Retirement in Old Age.

"O blest retirement, etc.—ere the world be past."

(b) His description of the village preacher and the village schoolmaster:

"A man he was, etc.—charity began."

"There, in his noisy mansion, etc.—carry all he knew."

10. What is the main argument of the "Deserted Village?" What age was the author when he wrote it? Quote a passage which seems regretfully to hint that his zest for enjoyment was not so great as it had been.

11. "The Deserted Village is one of the most graceful and touching poems in the English language. It is clear bird-singing; but there is a pathetic note in it." Quote and comment on passages illustrating its grace, melody, and pathos.

12. Classify Goldsmith's chief works; and name five of the most noted men of his time—the greatest in poetry, in criticism, in painting, in politics, and in the histrionic art.

JUNE EXAMINATIONS, 1881—continued.

FIRST YEAR.

MENSURATION.

Examiner: A. A. MACTAVISH.

1. Find the areas of the following:—

- (a) An equilateral triangle whose base is 12 chains.
- (b) A square whose side is 12 chains.
- (c) A circle whose diameter is 12 chains.
- (d) A regular hexagon whose side is 12 chains.

2. Find the area of a field from the following notes:—

L. OFF-SET.	C. LINE.	R. OFF-SET.
6	○ A 12 18 25 to B	90 west. 10

3. The width of a barn is 60 feet, the height of the gable 15 feet, the beam is 5 feet below the plate, the purline post is placed under the middle point of rafter and at right angles to it. At what distance from the centre of the beam will the other purline post rest?

4. Which will carry away the greater quantity of water, a four-inch tile or four three-inch tiles?

5. Compare the weights of the following:—An iron cube whose edge is two feet, an iron sphere whose diameter is two feet, and an iron cylinder whose length is two feet and diameter two feet.

6. How many cubic feet in a piece of timber 6 feet long, the large end being 24×36 and the small end 20×30 ?

SECOND YEAR.

AGRICULTURE.

Examiner: PROF. BUCKLAND (Toronto University).

1. State the origin, composition, and classification of soils.

2. How would you lay out a farm, say of 200 acres:—size of fields, roads, location and disposition of the homestead; planting for ornament and shelter, material for fencing—dead and live, and the percentage derivable of permanent forest?

3. State some of the principal modern improvements effected in farm implements and machines, and the circumstances under which horse, ox and steam could be readily and economically applied as motive powers.

4. What are the principles on which cultivation should be conducted, such as ploughing, subsoiling, trenching, etc., particularly as to depth?

5. The *rationale* of the rotation of crops: the various systems practised, giving details of such as would be practicable and profitable in Canada. Broadcasting and drilling seed grain compared; and the conditions which should determine the amount of seed per acre.

JUNE EXAMINATIONS, 1881—continued.

6. What preliminary steps would you take before commencing to drain a particular field or farm? The principles on which surface and underground drains should be constructed, as to depth, distance, inclination and materials. Illustrate by rough sketch.

7. What are the proper functions of drains, and the mechanical and chemical changes they produce in the soil, affecting the growth and maturity of crops?

8. State the composition and action of the more available mineral manures, particularly of lime, as carbonate, sulphate and phosphate.

SECOND YEAR.

LIVE STOCK.

Examiner : PROF. BUCKLAND (Toronto University).

1. Define the principal systems of breeding the domesticated animals, such as "in-and-in," "close," and "crossing,"—their respective advantages, and the cautions necessary to prevent disappointment.

2. The relative influence of parents on offspring. Conditions necessary to a healthy progeny. The law of "Atavism," or breeding back. "The value of pedigree."

3. Classify the most important breeds of horses, cattle, sheep and swine :—define their respective characteristic points and qualities, especially those best adapted to the various soils, productions, climates and markets of Canada or Britain.

4. What do you consider would be the readiest and generally most practicable way, as Canadian farmers are at present situated, of permanently improving their farm stock?

5. State the most economical, efficient and practicable systems of feeding and management of horses, cattle, sheep and swine throughout the year in this country, including the relative merits of pasturing and soiling.

6. State the readiest methods of collecting and preserving the excrements of farm animals, fluid and solid, and of preventing their fertilizing powers running to waste. Also the practicability and advantages of economising all available manurial substances on the farm by making them into compost heaps, and best methods of management.

7. Why is mixed husbandry generally practised in Canada in preference to purely arable or pastoral? The relations between the cultivation of roots and cereals and the breeding and fattening of animals?

8. What do you consider the weak points of Canadian farming, and the most available and economical means of correcting them?

SECOND YEAR.

PRACTICAL HANDLING AND JUDGING OF SHEEP.

Examiners : F. W. STONE and JAMES ANDERSON.

COTSWOLDS AND SOUTHDOWNS.

1. Point out the various defects in this animal [the one indicated by the examiners].

2. Point out the good qualities of this animal [another indicated by the examiners].

3. Explain the breeding properties for the improvement of mutton and wool.

4. Which of the two breeds is the most profitable at the present time? Give reasons for your answer.

JUNE EXAMINATIONS, 1881—continued.

SECOND YEAR.

PRACTICAL HANDLING AND JUDGING OF CATTLE.

Examiners: F. W. STONE and JAMES ANDERSON.

SHORTHORNS AND HEREFORDS.

1. Point out the defects in the Shorthorn.
2. What are the superior qualities in the same animal?
3. Compare the two, stating clearly the points of difference. Which is the better animal to breed from, and why?
4. Name the desirable points and qualities in animals (1) for dairying, (2) for the production of beef.

SECOND YEAR.

PRACTICAL AND ANALYTICAL CHEMISTRY.

Examiner: P. H. BRYCE, M.A., M.D.

1. How is a standard solution of H_2S prepared? What are its most probable impurities, and show why its strength depreciates with time.
2. A powdered mass of mineral, divided into five portions, is laid before you—
 - With 1—When $\text{C}_2\text{H}_4\text{O}_2$ being added, an *effervescence* is produced.
 - “ 2—Blowpipe reaction gives a *garlic* odour.
 - “ 3—When treated with HCl a smell of H_2S is given off.
 - “ 4—After treatment, as in No. 3, Pb 2 NO_3 gives a *white precipitate*.
 - “ 5—After treatment, as in No. 3, NH_4 HO gives a heavy *bronze-red precipitate*.

What is the substance?

3. (a) How is the free H_3PO_4 of a superphosphate estimated?
- (b) In what form is it most probably present in that made from unburnt bones?
- (c) What is *reverted* H_3PO_4 , and how is its amount calculated?
4. (a) What are the objections raised against the lactometer's accuracy in giving the true density and value of milk?
- (b) Indicate the successive steps in the quantitative analysis of a specimen of milk.
5. The *grey* mud flats of Truro, N.S., are formed of disintegrated ferruginous sandstone, mixed with marine salts and organic matter, both animal and vegetable. Such soils, when first ploughed and exposed to the air, are fatal to plant life, but by air and CaO become a *red* soil of inexhaustible fertility—(Dawson). Follow out the successive chemical changes by which this soil is improved, supposing its composition to be—
 - (a) Composition of rock— $\text{Fe}_2\text{O}_3 + \text{SiO}_2$, etc.
 - (b) Organic matter— C , H , O , N , S , $\text{P} + \text{CaCO}_3$ of shells.
 - (c) Marine salts—chlorides, sulphates, etc., of Na , K , Ca , Mg .

What is most probably the material most hurtful to vegetation?

6. A vessel contains lime-water; through this a current of CO_2 is passed. Explain the changes which take place, and show how this principle is of importance in the preparation of plant food from the soil.

JUNE EXAMINATIONS, 1881—continued.

SECOND YEAR.

SYSTEMATIC AND ECONOMIC BOTANY.

Examiner : P. H. BRYCE, M.A., M.D.

1. Taking the Ranunculaceæ as illustrative, show fully by example what essential points are included in a Natural Classification.
2. Place the following under their natural orders :—
 - (a) *Delphinium consolida*, *Brassica campestris*, *Sinapis alba*, *Podophyllum peltatum*, *Althea officinalis*, *Abutilon*.
 - (b) Describe the chief characteristics of *Abutilon*.
3. Describe the chief characteristics of the Leguminosæ, and name four economic genera of the order.
4. Give the chief characteristics of the Liliaceæ ; give three economic examples.
5. (a) Point out the peculiarities of the Gramineæ.
 (b) Give the chief distinctive points, economic value and natural habitat of *Calamagrostis canadensis*, *Dactylis glomerata*, *Bromus secalinus*, *Saccharum officinarum*, *Phleum pratense*.
6. Contrast the structure of a moss with that of a fern, and give the economic uses of the Algæ.
7. Identify the specimens before you, and analyze the plant numbered 10. Give the order, genus, and species to which each belongs.
8. Name the orders and genera to which the plants principally used for *soiling* and *pasturage* belong.

SECOND YEAR.

MATERIA MEDICA.

Examiner : A. SMITH, V.S.

1. Give the action and use of opium.
2. Give the dose of the tincture of opium for horse and ox.
3. How is chlorate of potash prepared ?
4. What is a sedative ?
5. Give the dose of nitrate of potash as a febrifuge for the horse.
6. Give nature, action, and uses of *nux vomica*.
7. Give nature, action, and uses of oil of turpentine.
8. When are Diuretics contra indicated ?

VETERINARY SCIENCE.

Examiner : A. SMITH, V.S.

ORAL EXAMINATION.

1. What are the causes and treatment of Spasmodic Colic ?
2. Define Strangles in the horse, and state how an animal suffering from them should be used.
3. Name some well-marked contagious disease in the horse.
4. Are Canadian cattle subject to many contagious diseases ?

JUNE EXAMINATIONS, 1881—continued.

5. Has contagious Pleura Pneumonia ever been known in Canada?
6. In what districts of the United States does Pleura Pneumonia exist?
7. What is the period of gestation in the cow and in the mare?
8. Describe the appearance of the mouth at four years old in the horse.
9. What diseases in the horse and mode of usage tend to produce Purpura Hæmorrhagica?
10. What diseases are liable to occur in hard-worked horses that are well fed and allowed to remain idle for a few days, and still well fed?
11. What are the causes of Laminitis, or Founder, in the horse?
12. What is Parturient Apoplexy in the cow, and how may the disease be prevented?
13. Define Cerebro-spinal Meningitis.

Following the above practical examination questions, a manipulative examination of horses was taken part in by the students.

ENGLISH LITERATURE.

MILTON'S "L'ALLEGRO" AND "IL PENSEROSO."

Examiner: W. TYTLER, B.A.

And ever, against eating cares,
Lap me in soft Lydian airs;
Married to immortal verse,
Such as the meeting soul may pierce,
In notes with many a winding bout
Of linked sweetness, long drawn out,
With wanton heed and giddy cunning,
The melting voice through mazes running;
Untwisting all the chains that tie
The hidden soul of harmony;
That Orpheus' self may —

1. Complete the sentence, and quote from *Il Penseroso* lines referring to the same story as the passage supplied.
2. Explain *lap*, *Lydian airs*, *married to immortal verse*, *meeting soul*, *winding bout*, *wanton heed*, *mazes*, *hidden soul*, and name any rhetorical figures in these expressions.
3. Meaning and derivation of *buxom*, *debonair*, *pied*, *junkets*.
4. What is the metre of the poem? Scan lines 1 and 6 of the extract.
5. Sketch briefly the plan of *L'Allegro*.

Or call up him who left half told
The story of Cambuscan bold.

6. Continue the quotation five lines. Who is meant by "him" in line 1?
7. "Virtuous ring and glass." Meaning of "virtuous." How were they virtuous?
8. "The buskin'd stage." Explain the epithet. What word in *L'Allegro* is equivalent to *buskin*? Quote the line in which that word occurs.
9. Derive *melancholy*, *glimmer*, *cypress*, *curfew*, *kercheft*, *hermitage*, *ecstasy*, *charm*, *frowned*.
10. What, according to Milton, are the pleasures of the Pensive Man?
11. Quote the introduction to both poems—twelve lines each.

JUNE EXAMINATIONS, 1881—continued.

12. Write brief notes on “Starred Ethiop Queen,”—“Philomel,”—“her dragon yoke,”—“to bless the doors from nightly harm,”—“thrice great Hermes,”—“day’s garish eye,”—“with honied thigh,”—“storied windows.”

13. Name and classify Milton’s chief poems. In what language other than English did he write poems?

14. Name three great poets before Milton, with one famous poem of each.

15. Mention the principal causes which made the period from the middle of Elizabeth’s reign to the Restoration so brilliant in a literary aspect.

N.B.—Marks will be deducted for errors in spelling and syntax; and added for literary excellence in the *style* of the answers.

SECOND YEAR.

SURVEYING.

Examiner: A. MACTAVISH.

1. (Using a pair of compasses) Show how to construct a triangle having its sides equal to three given straight lines.

2. (Using a pair of compasses) Show how to make a triangle equal to a given trapezium.

3. Cut off from a given triangle a given area, by a line drawn from a point in one of its sides.

4. At a certain distance from the College buildings, and on a level with its base, it is found that the angle of elevation of the top of flag-staff is 45° . At a distance of 58.4 feet from the building, the angle of elevation is found to be 30° . To what height does the flag-staff reach?

5. $ABCD$ is a rectangular field, of which the side AB is 12 chains and the angle ABD is 30° . Find

(a) The area of the field.

(b) The length of the offsets from the diagonal BD to the angles at A and C .

(c) Give “Field Book” notes for planning and finishing the area of the above field.

6. Plan and find the area of the field from the following notes:—

L. OFFSET.	CHAIN LINE.	R. OFFSET.
	○ A range E	
	700	700. C
2.0	1300	
D .1350	2650	1000. E
	3375	
	to ○ B	

Scale, 10 chains to an inch.

III.—PAPERS SET AT THE MATRICULATION EXAMINATIONS,
APRIL, 1881.

ENGLISH GRAMMAR.

Examiner: JAMES MILLS, M.A.

1. Define the terms *case*, *person*, *comparison*, *voice*, and give an example of each.
2. State and illustrate the different ways of distinguishing gender in English nouns and pronouns.
3. Compare the adjectives *hot*, *pleasant*, *nigh*, *late*. Distinguish *later* and *latter*, *elder* and *older*, *few* and *a few*.
(a) Is there any objection to such forms as *chiefest*, *extremest*, *most universal*?
4. What is the plural of *staff*, *canto*, *fife*, *dwarf*?
5. Give the meaning of the following words in the singular and the plural number :
iron, *salt*, *spectacle*, *pain*.
6. Change the following sentences so as to use the passive instead of the active voice of the verb in each case :—

- (1) James taught me geography when I was a boy.
- (2) My first master instructed me in the art of parsing.
- (3) I bade him depart.

7. "Sweet Auburn ! loveliest village of the plain,
Where health and plenty cheered the labouring swain ;
Where smiling spring its earliest visit paid,
And parting summer's lingering blooms delayed :
Dear lovely bowers of innocence and ease,
Seats of my youth, when every sport could please,
How often have I loitered o'er thy green,
Where humble happiness endeared each scene !"

- (a) Parse all the words in the first two lines of the above extract.
- (b) Divide the last four lines into simple propositions, stating the kind and connection of each.

8. Give the past tense and perfect participle of *saw*, *sit*, *set*, *see*, *fly*, *lie* and *lay*.
9. Point out the errors in the following, and give reasons for corrections in each case :—
(1) If thou is honest, I love you.
(2) As neither of them are going, let you and I go.
(3) Neither you nor me are invited.
(4) Let each esteem other better than themselves.
(5) Whom do men say that I am ?

ARITHMETIC.

Examiner: A. A. MACTAVISH.

1. By what must 17 miles 121 yards 31 feet be divided to give for quotient 37 perches?
2. How many square feet in a plot of ground 3 perches 14 feet long and 5 yards 11 inches wide?
3. A block of stone is 36 feet long, 2 yards wide and $6\frac{3}{4}$ feet deep. How far from the end must it be cut to have 3 cubic yards?

MATRICULATION EXAMINATIONS, 1881—continued.

4. Find the cost of 196 bags of wheat, each (exclusive of bag) weighing 119 pounds, at \$1.96 per bushel.

5. John can do a piece of work in $2\frac{1}{3}$ days, James can do it in $5\frac{1}{2}$ days. In how many days can they both do three times the work?

6. From the sum of the two largest of the following fractions take the difference of the two smallest :—

$$\frac{2}{3}, \frac{3}{4}, \frac{3}{5}, \frac{3}{6}, \frac{1}{6}, \frac{1}{2}, \frac{5}{6}.$$

7. After giving away $\frac{1}{10}$ of my money, then $\frac{2}{5}$ of the remainder, then \$17 less than 18 pounds 19 shillings 6 pence, I had still \$17 left. How much had I at first?

8. What is the cost of carpeting a floor 26 feet long and 21 feet wide with carpet 2 feet wide and worth \$1.20 per yard?

GEOGRAPHY.

Examiner: J. HOYES PANTON, M.A.

1. Name the principal mountain ranges running north and south in the Eastern and Western hemispheres.

2. Where and what are the following :—Genoa, Sumatra, Amoor, Elba, Kamloops, Yucatan, St. Roque, Isandula, Balkan, Chio?

3. Name the counties bordering on Lake Ontario, and give the county town of each.

4. Sketch a map of North America, showing the positions of the following :—Red River, Dakotah, Emerson, New Orleans, New York, Quebec.

5. What railroads run through the following places :—Guelph, Hamilton, Quebec, Barrie, Harrisburg?

6. Explain the following terms :—Tropics, longitude, estuary, pampas, strait.

READING, DICTATION, AND COMPOSITION.

Examiner: J. HOYES PANTON, M.A.

READING.

1. Fourth Book (page 240). Read the lines marked.

DICTATION.

2. Page 261. Write "After—Earth."

COMPOSITION.

3. Write a composition on any of the following :—

(a) Promptness in the discharge of duty.

(b) Science in farming.

(c) Honesty is the best policy.

APPENDIX 4.

ONTARIO AGRICULTURAL COLLEGE.

CLASS LISTS.

Easter Examinations, 1881.

FIRST YEAR.

CLASSES.	AGRICULTURE.	LIVE STOCK.	PRACTICAL HANDLING AND JUDGING OF CATTLE.	PRACTICAL HANDLING AND JUDGING OF SHEEP.	INORGANIC CHEMISTRY.
I.	1 MacLeod. 2 Stonehouse. 3 Gibb. 4 { Philbin. { Williams.	1 McArthur. 2 Stonehouse. 3 { Gibson, R. { Gibb. 5 Stover. 6 { Williams. { Ramsay.	1 McArthur.	1 Stover. 2 Shuttleworth. 3 Terhune. 4 { Gibson, R. { McIlquham, J. 6 { Wyndham. { Stonehouse. 8 { Philbin. { Ramsay. 10 Poe. 11 Carpenter. 12 { McArthur. { Gibb. { Lindsay, S. 15 Moore. 16 Wettlaufer. 17 Myers.	1 McArthur. 2 { Stover. { Barclay. 4 Jones. 5 Poe.
II.	1 McArthur. 2 { Stover. { Shuttleworth. 4 Gibson, R. 5 Davis. 6 Jones. 7 Job. 8 Poe. 9 { Blanchard. { Ramsay. { McIlquham, J. 12 Elworthy. 13 { Myers. { George. 15 Petapiece. 16 { Shearer. { Kippen. { Folkes. 19 Mahony. 20 Lindsay, S. 21 { White W.G. { Lindsay, S. 23 Schull.	1 Jones. 2 Shuttleworth. 3 Lindsay, S. 4 { George. { Lindsay, W. { White, W.G. 6 { Davis. { Poe. 9 Petapiece. 10 Philbin. 11 MacLeod. 12 Job. 13 McIlquham, J. 14 Dennis. 15 Gilpin. 16 McLaren. 17 Mahony. 18 Silverthorn. 19 Douglas. 20 Hallesy. 21 Dewar. 22 Elworthy. 23 Blanchard. 24 Barclay.	1 Shuttleworth. 2 Hallesy. 3 Gibson, R. 4 McIlquham, J. 5 Gibb. 6 Williams. 7 Gaw. 8 Stover. 9 Petapiece. 10 Stonehouse. 11 Silverthorn. 12 Poe. 13 { Myers. { George. { Philbin.	1 Barclay. 2 { Brown. 27 { Silverthorn. { Egleston. 29 { George. 3 Bignell. 29 { McLaren. 4 Blanchard. 29 { Law. 5 Job. 31 { Hallesy. 6 Schull. 31 { Tronson. 7 Petapiece. 31 { Shaver. 8 Shearer. 31 { Grant. 9 White, C. 31 { McPhail. 10 Henderson 36 { Redmond. 11 Matthew- 36 { Armstrong man. 37 { Mahony. 12 Dewar. 37 { Dawson. 13 White, W. 40 { Williams. G. 40 { Lindsay W. 14 MacLeod. 42 { Ferguson. 15 Dennis. 42 { Elworthy. 16 Bethune. 45 { Gould. 17 Chase. 45 { Rogers. 18 { Jones. 19 Begg. 20 { Davis. 21 McKim. 22 { Gaw. { Watt J.M. 23 { Gilpin. { Douglas.	1 Job. 2 Lindsay, S. 3 Blanchard. 4 Petapiece. 5 Stonehouse. 6 Schull. 7 Dewar. 8 McLaren. 9 Tronson. 10 Grant. 11 { Silverthorn. { White, W.G.

CLASS LISTS—*Continued.*

FIRST YEAR.

CLASSES.	AGRICULTURE.	LIVE STOCK.	PRACTICAL HANDLING AND JUDGING OF CATTLE.	PRACTICAL HANDLING AND JUDGING OF SHEEP.	INORGANIC CHEMISTRY.
Pass. III.	1 Wyndham.	1 Bethune.	{ Dewar.	Kippen.	1 { Dawson.
	2 McLaren.	2 Goold.	1 { Barclay.	.....	1 { Mahony.
	{ Bethune.	3 Armstrong.	{ Blanchard.	.....	3 Bowman.
	3 { Tronson.	4 Shaver.	4 { Mahony.	.....	4 Shuttleworth.
	{ Bowman.	5 Myers.	{ Chase.	.....	5 Lindsay, W.
	6 Armstrong.	6 Tronson.	6 { Pope, E.	.....	6 Bignell.
	7 Dawson.	{ Grant.	6 { Carpenter.	.....	7 George.
	{ Hallesy.	7 { Carpenter.	8 Brown.	.....	8 Philbin.
	8 { Bignell.	{ Chase.	{ McLaren.	.....	9 Davis.
	{ Dennis.	10 Bowman.	{ Ferguson.	.....	10 Bethune.
	{ Shaver.	{ Terhune.	{ Henderson.	.....	11 White, C.
	12 Chase.	11 { Redmond.	9 { Shaver.	.....	12 Ramsay.
	{ Pope, E.	{ White, C.	{ Wyndham.	.....	13 { Armstrong.
	13 { Dewar.	{ Matthewman.	{ Schull.	.....	{ Dennis.
	{ Carpenter.	{ Wyndham.	{ Elworthy.	.....	15 Gibb.
	16 { White, C.	14 { Begg.	{ Eggleston.	.....	16 { Redmond.
	{ Goold.	{ Schull.	16 { White, W. G.	.....	{ Elworthy.
	18 { Henderson.	{ Moore.	{ MacLeod.	.....	18 { Matthewman.
	{ Grant.	{ McPhail.	19 Dawson.	.....	19 Williams.
	{ Terhune.	20 Dawson.	{ Wettlaufer.	.....	20 Shearer.
	20 { Barclay.	{ Beaudet.	20 { Gilpin.	.....	21 MacLeod.
	{ Moore.	{ Rogers.	{ Rogers.	.....	22 Wyndham.
	23 { Law.	21 { Kippen.	{ Goold.	.....	23 Terhune.
	{ Wettlaufer.	{ McKim.	23 { Lindsay, S.	.....	24 Hallesy.
	26 { McKim.	{ Bignell.	{ Ramsay.	.....	{ Gilpin.
	{ Douglas.	{ Shearer.	26 { Redmond.	.....	{ Carpenter.
	28 Redmond.	27 Henderson.	{ White, C.	.....	27 McPhail.
	29 Silverthorn.	Gaw.	28 { Grant.	.....	28 Kippen.
	Gilpin.	Law.	{ Bignell.	.....	29 { Moore.
	McPhail.	Wettlaufer.	{ Jones.	.....	{ Chase.
	Begg.	Pope, E.	{ Dennis.	.....	31 Goold.
	Rogers.	Brown.	30 { Job.	.....	32 Wettlaufer.
	Brown.	Eggleston.	{ McPhail.	.....	33 Brown.
	Eggleston.	.....	{ Douglas.	.....	34 Pope, E.
	Beaudet.	.....	35 Moore.	.....	Henderson.
	Matthewman.	.....	{ Armstrong.	.....	Douglas.
	Ferguson.	.....	36 { Shearer.	.....	Shaver.
	.....	.....	{ Matthewman.	.....	McKim.
	.....	.....	{ Tronson.	.....	Rogers.
	.....	.....	40 Bethune.	.....	Begg.
	.....	.....	41 McKim.	.....	Gaw.
	.....	.....	42 Lindsay, W.	.....	Law.
	.....	.....	43 Terhune.	.....	Eggleston.
	.....	.....	44 Davis.	.....	Ferguson.
	.....	.....	45 Law.	.....	Gibson.
	.....	.....	46 Begg.	.....	Ffolkes.
	.....	.....	Kippen.	.....	Knuth.
	.....	.....	Watt, J. M.	.....	.....

Names unnumbered are those of Students who have failed to pass in the subject.

CLASS LISTS—Continued.

FIRST YEAR.

CLASSES.	ORGANIC CHEMISTRY.	ZOOLOGY.	VETERINARY ANATOMY.	ENGLISH LITERATURE.	ENGLISH COMPOSITION.
Pass. III.	1 McPhail.	1 Dawson.	{ Shearer.	1 McLaren.	1 Silverthorn.
	2 { Gilpin.	2 Gibb.	1 { Williams.	2 Bowman.	2 McLaren.
	{ Dawson.	3 Matthewman.	{ Wettlaufer.	3 Moore.	3 Shearer.
	4 Shaver.	4 Grant.	4 Gilpin.	4 Law.	4 Wettlaufer.
	5 Armstrong.	5 Beaudet.	5 Goold.	5 Elworthy.	5 { George.
	6 Tronson.	6 Wyndham.	{ McIlquham, J.	6 Stonehouse.	{ Lindsay, S.
	7 Petapiece.	7 White, C.	Moore.	7 Schull.	7 { Bignell.
	8 Williams.	8 Redmond.	6 { Dawson.	8 Williams.	{ Moore.
	9 Chase.	9 Davis.	Pope, E.	9 Gibb.	9 { Dennis.
	10 { Lindsay, S.	10 Gibson.	Redmond.	10 Tronson.	{ Tronson.
	{ Bignell.	11 Rogers.	11 Gaw.	11 Mahony.	11 Gaw.
	12 Dennis.	12 Petapiece.	12 Bignell.	12 Shearer.	12 Carpenter.
	13 Mahony.	13 Carpenter.	13 Mahony.	13 Pope, E.	13 { Matthewman.
	14 Matthewman.	14 Terhune.	14 { Brown.	14 Dawson.	{ Lindsay, W.
	15 Moore.	15 Shaver.	14 { McPhail.	15 { Davis.	15 { Law.
	16 Lindsay, W.	16 { Gilpin.	Schull.	15 { Hallesy.	15 { Hallesy.
	17 MacLeod.	16 { Moore.	16 { Flworthy.	17 Armstrong.	17 Chase.
	18 White, W. G.	18 Henderson.	18 { Davis.	{ Carpenter.	18 Henderson.
	19 Terhune.	19 Mahony.	Law.	Kippen.	19 Brown.
	20 Philbin.	20 McIlquham.	20 George.	18 { Terhune.	20 { Shearer.
	21 Douglas.			McKim.	{ Mahony.
	22 Carpenter.	Douglas.	Wyndham.	{ Matthewman.	{ Watt, J.
	23 Goold.	Brown.	Rogers.	23 Lindsay, S.	{ McPhail.
	24 White, C.	Kippen.	Kippen.		24 { Elworthy.
	25 { Shearer.	Law.	Matthewman.	Wyndham.	{ Douglas.
	{ Gibb.	McKim.	Terhune.	Chase.	{ Rogers.
	27 Schull.	Begg.	Gibb.	Gilpin.	26 { Bowman.
	{ Kippen.	Ferguson.	Beaudet.	Goold.	{ Begg.
	28 { Wettlaufer.	Gaw.	Begg.	Henderson.	29 { Ramsay.
	{ George.	Egleston.	Douglas.	McIlquham.	{ White, C.
	{ Gaw.	.....	Shaver.	Shaver.	31 { Redmond.
	31 { Henderson.	.....	McKim.	McPhail.	{ McIlquham, J.
	{ Law.	.....	Ffolkes.	Begg.	33 Terhune.
	34 Pope, E.	.....	Egleston.	Gaw.	34 Pope, E.
	35 Wyndham.	.....	Knuth.	Redmond.	35 McKim.
	McKim.	.....	.....	Brown.	
	Brown.	.....	.....	Egleston.	Ferguson.
	Begg.	.....	.....	Douglas.	Egleston.
	Egleston.	.....	.....	Watt, J. M.	Wyndham.
	Ferguson.	.....	.....	Rogers.	.....
	Ffolkes.	.....	.....	Ferguson.	.....
	Knuth.	.....	.....	.....	.....

Names unnumbered are those of Students who have failed to pass in the subject.

CLASS LISTS—Continued.

FIRST YEAR.

CLASSES.		ARITHMETIC.	BOOK-KEEPING.	GENERAL PROFICIENCY.	DEPART- MENTS.	FIRST CLASS MEN IN THE DEPARTMENTS.
PASS.	III.	20. Shaver. Begg. Hallesy. Law. Schull. Barclay. White, W. G. Armstrong. Gilpin.	Egleston. White, W. G. Wyndham. Schull. Redmond. Kippen. Pope, E. Ferguson. Ffolkes. Shaver. Beaudet. Knuth.	21 Terhune, F. 22 Henderson, D. 23 McPhail, E. 24 Redmond, S. 25 Matthewman, E. 26 Brown, W. 27 Law, F. E. 28 Shaver, C. B.	IV. ENGLISH.	1 McArthur, J. 2 Barclay, E. H.
		White, C. Carpenter. Goold. Lindsay, W. Bowman. McPhail. McKim. Gaw. Redmond. Davis. Pope, E. McIlquham, J. Wyndham. Egleston. Kippen. Ferguson. Rogers. Beaudet. Knuth.	Pope, E. Douglas, J. Gaw, W. W. Wyndham, W. Kippen, H. B. McKim, J. A. Rogers, F. Begg, R. A. Egleston, G. Myers, W. Ferguson, G. A. Beaudet, G.	V. MATHEMATICS AND BOOK-KEEPING.	1 McArthur, J. 2 Bignell, E.	

Names unnumbered are those of Students who have failed to pass in the subject.

SECOND YEAR.

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CLASS LISTS—Continued.

SECOND YEAR.

CLASSES.	AGRICULTURE.	LIVE STOCK.	PRACTICAL HANDLING AND JUDGING OF CATTLE.	PRACTICAL HANDLING AND JUDGING OF SHEEP.	ARBORICULTURE.
PASS. III.	1 Chariton. 2 { Robins. Woodley.	1 Ward. 2 Woodley.	1 Clutton. { Horne. 2 { Woodley Cross. { Cuppage. 5 { Newton. Noble. 8 { Pope, H. Nicol. 10 { Charlton. Myine. 12 Skaife. 13 Segsworth. 14 { McFarlane. McNaughton.	1 McFarlane. 2 Cross. 3 Landsborough. 4 { McNaughton. Noble. 6 Torrance. 7 Ward. 8 Dickinson, S. 9 Patton. 10 Ross, W. J. 11 Mylne. 12 { Pope, H. Robins. Segsworth. Woodley.	
			Ross, W. J. Torrance.		

Names unnumbered are those of Students who have failed to pass in the subject


SECOND YEAR.

* Names unnumbered are those of Students who have failed to pass in the subject.

CLASS LISTS—Continued.

SECOND YEAR.

[illegible]

 Names unnumbered are those of Students who have failed to pass in the subject.

CLASS LISTS—Continued.

SECOND YEAR.

CLASSES.	VETERINARY PATHOLOGY (THE HORSE).	PRACTICAL HANDLING AND JUDGING OF HORSES.	ENGLISH LITERATURE.	ENGLISH COMPOSITION.	POLITICAL ECONOMY.
PASS. III.	Chipman.	Ward.	.....	.....
	Anderson,	Woodley.	.....	.....
	H. F.	Noble.	.....	.....
	Clutton.	.....	.....	.....
	Horne.	.....	.....	.....
	Noble.	.....	.....	.....
	Ward.	.....	.....	.....
	Woodley.	.....	.....	.....
	15	Ross, W. J.	.....	.....	.....
	Patton.	.....	.....	.....
	Robins.	.....	.....	.....
	Glass.	.....	.....	.....
	Dickinson.	.....	.....	.....
	C. S.	.....	.....	.....
	Pope, H.	.....	.....	.....
	Skaife.	.....	.....	.....
	Ross, J. G.	.....	.....	.....
	Torrance.	.....	.....	.....
	McNaughton.	.....	.....	.....
	Fotheringham.	.....	.....	.....

Names unnumbered are those of Students who have failed to pass in the subject.

APPENDIX 5.

FINANCIAL TABLES.

- 1.—Appropriation Expenditure for 1881.
- 2.—Statement of Revenue for 1881.
- 3.—Estimated Expenditure for 1882.
- 4.—College in account with Farm and Garden.

ONTARIO AGRICULTURAL COLLEGE.

1. APPROPRIATION EXPENDITURE FOR 1881.

A.— <i>Maintenance Account.</i>		
	£ c.	£ c.
I.— <i>Salaries and Wages</i>	10,571 52	
II.— <i>Food.</i>		
Meat, fish and fowl	3,956 59	
Bread and biscuit.....	1,267 78	
Groceries, butter and fruit.....	4,122 67	
III.— <i>Household Expenses.</i>		
Fuel	1,983 47	
Light	977 74	
Laundry, soap and cleaning	207 49	
Furniture and furnishings	452 47	
Repairs and alterations	352 75	
Servants' wages (women)	1,786 19	
IV.— <i>Business Department.</i>		
Advertising, printing, postage and stationery.....	616 92	
V.— <i>Miscellaneous.</i>		
Maintenance of chemicals.....	123 78	
Unenumerated	798 63	
VI.— <i>Payments not provided for in Estimates.</i>		
Books for library (Cyclopedia Britannica, herd books, books on agriculture, etc.)	356 53	27,573 62
B.— <i>Capital Account.</i>		
I.— <i>Furniture and Furnishing</i>	2,000 03	2,000 03
		29,573 65

2. COLLEGE REVENUE FOR 1881.

	\$	c.	\$	c.
January—Tuition fees	75	00		
Balances on board account	139	83		
			214	83
February—Balances on board account			67	19
March—Tuition fees	75	00		
Balances on board account	51	46		
			126	46
April—Tuition fees	1,125	00		
Balances on board account	1,184	62		
			2,309	62
May—Tuition fees	150	00		
Balances on board account	739	42		
			889	42
June—Balances on board account			142	68
July—Balance on board account			10	00
August—Balances on board account			146	23
September—Tuition fees	525	00		
Balances on board account	183	28		
			708	28
October—Tuition fees	1,000	00		
Balances on board account	229	96		
			1,229	96
November—Tuition fees	397	75		
Balances on board account	304	37		
			702	12
December—Tuition fees	175	00		
Balances on board account	548	37		
Fees for Supplemental Examinations	64	00		
Worn-out carriage horse	50	00		
			837	37
			7,384	16

Analysis.

Tuition fees	\$3,522 75
Balances on board accounts	3,742 41
Fees for Supplemental Examinations	64 00
Horse	50 00
Lamps	5 00
	<u>\$7,384 16</u>

3. ESTIMATED EXPENDITURE FOR 1882.

	Voted for 1881.	Required for 1882.		
	130 Students.	130 Students.		
I.—COLLEGE AND BOARDING-HOUSE.				
(a) Salaries and Wages.	\$ c.	\$ c.	\$ c.	
President, Resident Master, Professor of English Literature and Political Economy	2,000 00	2,000 00		
Professor of Agriculture and Farm Superintendent	2,000 00	2,000 00		
Professor of Chemistry, Geology and Meteorology, Librarian	1,500 00	1,500 00		
Professor of Biology and Horticulture, Assistant Resident Master ..		1,000 00		
Professor of Veterinary Science	600 00	1,000 00		
Professor of Mathematics and Assistant Resident Master	500 00	1,000 00		
Bursar and Storekeeper (formerly boarded and lodged in College) ..	500 00	800 00		
Physician	300 00	400 00		
Instructor in Drill and Gymnastics (gave services gratis for year and a half)		150 00		
Farm Foreman	600 00			
Foreman of Horticultural Department	600 00			
Foreman of Mechanical Department	600 00			
Matron and Housekeeper	400 00	400 00		
Engineer	500 00	600 00		
Assistant Engineer—six months	180 00	198 00		
Stoker and Night Watchman—six months		120 00		
Janitor and Messenger	150 00	150 00		
Temporary assistance	100 00	100 00		
	10,530 00			11,418 00
(b) Expenses of Boarding-House.				
Meat, fish and fowl	4,000 00	4,000 00		
Bread and biscuit	1,600 00	1,500 00		
Groceries, butter and fruit	4,200 00	4,200 00		
Fuel	2,500 00	2,400 00		
Light	1,000 00	1,000 00		
Laundry, soap, and cleaning	300 00	300 00		
Furniture and furnishing	550 00	550 00		
Women servants for Boarding-house—17 in number	1,750 00	1,750 00		
Repairs and alterations	650 00	650 00		
Advertising, printing, postage and stationery	600 00	600 00		
Maintenance of chemicals	150 00	150 00		
Library (books, papers and periodicals)		200 00		
Unenumerated	700 00	700 00		18,000 00
	28,530 00			29,418 00
Less revenue (tuition fees and board)	7,384 16			8 500 00
	21,145 84			20,918 00
II.—EXPERIMENTAL FARM.				
Farm Foreman		600 00		
Foreman of Horticultural Department		600 00		
Foreman of Mechanical Department		600 00		
Experiments (labour, seeds, manures, etc.)		1,500 00		3,300 00
	21,145 84			24,218 00

IV. COLLEGE IN ACCOUNT WITH FARM AND GARDEN FOR THE
YEAR 1882.

Dr.				
(a) With Farm.				
To Potatoes	130 bags	@	\$ c.	\$ c.
" " "	100 "		0 50	65 00
" Turnips	25 "		0 80	89 00
" Wheat	70 "		0 12½	3 12
" " "	50 "		1 10	77 00
" " "			1 20	60 60
" Wood				20 00
" Milk	3,400 gallons		0 03	272 00
" Keep of College horse				100 00
" Carting for College				30 00
" Carpenter's work				70 00
				777 12
(b) With Garden.				
To Apples	30 barrels		1 00	30 00
" " "	30 "		1 50	45 00
" Asparagus	557 bunches		0 02	11 14
" Beets	26 bushels		0 40	10 40
" Beans (in pod)	11½ "		1 00	11 50
" Capsicum	3 pecks		0 40	1 20
" Celery	280 bunches		0 07	19 60
" Carrots	27½ bushels		0 25	6 62
" Cabbage	86½ dozen		0 40	34 60
" Currants	1½ bushels			3 50
" Cauliflower	8½ dozen		0 84	7 14
" Crab Apples	5½ bushels		0 25	1 37
" Corn	23½ dozen		0 10	2 35
" Citron	8 dozen (small)		0 56	2 88
" Cucumbers	12 "		0 25	3 00
" Gooseberries	1 bushel			2 50
" Grapes	6 bushels		2 50	15 00
" Lettuce	60 dozen		0 20	12 00
" Melons	2 dozen		1 20	2 40
" Onions	13 bushels		0 75	9 75
" Pickling Onions	1½ "		1 25	1 87
" Parsnips	54½ "		0 35	19 07
" Peas (in pods)	19½ "		0 70	13 65
" Pickling Cucumbers	4½ "		1 50	6 75
" Plums	1 bushel		3 00	3 00
" Pears	1 "		1 50	1 50
" Potatoes	30 bushels		0 60	18 00
" " "	47½ "		0 40	19 00
" Rhubarb	450 bunches		0 02	9 00
" Radish	2 bushels		2 00	4 60
" Raspberries	1 quart		0 10	0 10
" Squash	11 dozen		0 25	2 75
" Spinach	5 bushels		0 75	3 75
" Tomatoes	32 "		0 30	9 60
" Turnips	43 "		0 12½	5 37
" Vegetable Marrow	13½ dozen			8 00
" Winter Radish	½ bushel		3 00	1 50
				355 86
Cr.				
				1,132 98
By amount paid for Students' labour, at rates fixed by Farm Superintendent and foremen :				
January				373 00
February				454 33
March				226 00
April and May				787 86
June				668 94
July				709 78
August				666 32
October				386 95
November				659 49
December				269 94
				5,202 61
By balance				4,069 51

APPENDIX 6.

DESCRIPTION OF BUILDINGS, ETC.,

PREPARED BY THE ARCHITECT OF THE PUBLIC WORKS DEPARTMENT, JANUARY, 1881.

The Farm, containing 550 acres, was purchased from Mr. F. W. Stone, Guelph, in 1873, for the sum of \$75,000, and is situated on the Dundas road, about one mile from the City of Guelph.

The buildings have been erected on an elevated portion of the Farm, on the north side of the Dundas road, commanding an extensive view of the surrounding country and the City of Guelph. The principal entrance is from the Dundas road, at the south-west angle of the grounds in front of the buildings, which have been skilfully planted; the hot-houses and horticultural gardens being in the south-east part of the premises, and having a separate entrance on the Dundas road.

The original building, to which additions have been made according to the requirements of the College, as the number of pupils increased, consisted of a stone dwelling-house, 53 feet by 39 feet, with addition in the rear for kitchen, laundry, etc., 60 feet by 24 feet, the whole being two storeys in height.

Commodious farm buildings of stone and wood, with enclosed yards, also stone, brick, and wood farm houses, were also on the premises when purchased, and the lots were surrounded by good post and rail fences. The greater portions of the lots were cleared and well cultivated, the remaining portions being wooded and retained for ordinary farm requirements.

The following additions were made from time to time to the original dwelling-house:—Dining, reading and class-rooms, also a lavatory, laundry, steam-heating apparatus, and apartments for the domestics were constructed in 1873-74, the College having been opened in the latter year. Apartments for twenty-eight pupils were fitted up in the stone farm house, in the front portion of the grounds. This building was burnt down in February last year, and the walls were so much injured that it has not been reconstructed.

In 1875 a mansard roof was constructed over the front portion, and at a distance of 50 feet on the south-east side, the College authorities erected a building 40 feet by 50 feet, two storeys in height, with mansard roof, for lecture and class-rooms.

An addition, 94 feet in length by 50 feet in width, two storeys in height, with mansard roof, was made on the north-west side in 1877, affording accommodation for thirty additional pupils, with a new dining-room, also apartments for the Professor of Agriculture. A cheese factory was also erected south of the Dundas road. Further additions were made in 1879 and 1880, consisting of store-rooms, Matron's and domestic apartments, also a larger dining-room, 62 feet by 40 feet, and dormitories for sixty additional pupils, making, in all, apartments for 130 pupils, with larger reading-room and library, baths and wash-rooms, all being heated by steam, on the direct low-pressure principle, by means of coils and radiators; a new boiler-house, 38 feet by 24 feet, containing two large steam boilers, with coal-house attached, having been constructed for the purpose.

The water supply at present is from wells and tanks on the premises; and the water is pumped into a large tank in the centre tower, from whence it is distributed to the several baths, wash-rooms and sinks, the baths and sinks being also supplied with hot water. Arrangements will probably be made with the City Water Works of Guelph to extend their mains to the buildings during 1881, when water will not only be supplied for the requirements of the College, thereby saving the cost of pumping, according to present arrangements, but the buildings will be protected from fire by means of hydrants in the grounds.

The City Gas Company of Guelph extended their mains to the buildings during 1880, and all the apartments are now supplied with gas-light. The buildings now completed occupy a space of 240 feet in front by 180 feet in depth, and contain a reception-room and office, four large class and lecture-rooms, with dining and reading-rooms, library, dormitories for 130 pupils, bath-rooms and lavatories, and apartments for the President, Professor of Agriculture, Assistant Master and Bursar; also Matron's and servants' rooms.

The perspective view shown on frontispiece, and the accompanying plans, which have been prepared in the Department, will explain the arrangement, dimensions and relative position of the various apartments, also the external appearance of the building, which now presents more of a public character than might have been expected, considering the basis on which the various superstructures were erected.

Further improvements will have to be made in 1881, to complete the furnishing and other internal arrangements, and render the buildings suitable in all respects for the requirements of the College.

The total cost of land and buildings, furniture, live stock, implements, drainage, etc., to the end of 1880, amounts to \$198,029.51.

APPENDIX 7.

CIRCULAR OF THE ONTARIO AGRICULTURAL COLLEGE AND EXPERIMENTAL FARM.

STAFF.

(a) College.

1. JAMES MILLS, M.A., President, *Professor of English Literature and Political Economy.*
2. WM. BROWN, C.E., P.L.S., *Professor of Agriculture.*
3. J. HOYES PANTON, M.A., *Professor of Chemistry.*
4. J. PLAYFAIR McMURRICH, B.A., *Professor of Biology and Horticulture.*
5. E. A. A. GRANGE, V.S., *Professor of Veterinary Science.*
6. WM. NATTRESS, First Class A Provincial Certificate, *Professor of Mathematics and Assistant Resident Master.*

A. T. DEACON, *Bursar.*

(b) Farm.

1. WM. BROWN, C.E., P.L.S., *Farm Superintendent.*
2. P. J. WOODS, *Farm Foreman.*
3. J. S. FORSYTH, *Foreman in the Horticultural Department.*
4. JAMES MACKINTOSH, *Foreman in the Mechanical Department.*

INTRODUCTION.

The institution known as the "Ontario Agricultural College and Experimental Farm" is situated about a mile to the south of the City of Guelph, in the centre of an extensive agricultural and noted stock-raising district, readily accessible by rail from all parts of the Province. The Farm consists of 550 acres, about 400 of which are cleared. It is composed of almost every variety of soil, and is therefore well suited to the purposes for which it was selected.

Immediately upon taking possession, the Government appointed a Commission to inquire and report regarding "the manner of adapting the said Farm and management and control thereof to the purpose of a Model and Experimental Farm." A few extracts from the Report of this Provincial Farm Commission will show clearly the basis upon which the institution is at present established :—

"The objects of the institution should be—First, to give a thorough mastery of the practice and theory of husbandry to young men of the Province engaged in Agricultural or Horticultural pursuits, or intending to engage in such ; and, second, to conduct experiments tending to the solution of questions of material interest to the Agriculturists of the Province, and publish the results from time to time.

"That the Farm should be separated into five distinct departments, namely :—

- "1. Field Department.
- "2. Horticultural Department.
- "3. Live-Stock Department.
- "4. Poultry, Bird, and Bee Department.
- "5. Mechanical Department.

"All permanent improvements on the Farm should be carried out on a gradually developed system, and in such a manner as to exhibit and test the comparative values of the most approved methods of executing the several works, and to test the cost, convenience, and durability of the several appliances from time to time recommended for adoption on the farms of the Province."

In order to carry out the suggestions of the Provincial Farm Commission, the Government made such improvements on the residence found on the place as would best utilize it for present purposes. Accommodation was provided for about twenty-five pupils, a Principal and a Rector were appointed, and a Foreman for each of the following departments engaged, viz.:

1. Farm Department.
2. Live Stock Department.
3. Horticultural Department.
4. Mechanical Department.

Work commenced in May, 1874. Since that time considerable progress has been made. There are now ninety-two students in attendance, all boarding in the institution; and it is hoped that our Parliament, at its next session, will make an appropriation, to increase the accommodation at once. Many improvements have been made on the Farm. A considerable portion of it has been well drained, suitable implements have been provided, and a very fair representation of stock secured—seven breeds of cattle, five of sheep, and three of pigs. The Horticultural Department has been thoroughly established, and is now one of the most efficient means of education in connection with the institution.

TERMS OF ADMISSION.

1. Each candidate must be at least fifteen years of age.
2. He must produce satisfactory certificates—
 - (1) As to moral character.
 - (2) As to physical health and strength.
 - (3) As to the assent of his parents or guardians.
 - (4) As to his intention to follow Agriculture or Horticulture as an occupation.
3. He must pass the Matriculation Examination.
4. If a ratepayer, or a *bona fide* resident of the Province of Ontario, he must pay a fee of \$25 a year in advance; if not, he must pay a fee of \$50 a year in advance.

The subjects for matriculation are as follows:

- (a) Reading, Writing, and Dictation.
- (b) English Grammar—Parsing and Analysis.
- (c) Arithmetic—to the end of Simple Proportion.
- (d) The outlines of General Geography, and the Geography of Canada.

Candidates for admission are required to present themselves for examination on the 16th of April or the 1st of October, at 9 a.m., in the Lecture Room of the College.

First, Second, and Third Class Teachers, holders of Intermediate Certificates, or Certificates of Entrance into the High Schools or Collegiate Institutes of Ontario, Graduates or Undergraduates of any University in Her Majesty's dominions, will be admitted on presentation of certificates or diplomas. Intending students from Ontario, who do not hold any such certificate or diploma, are advised to pass the examination for admission to High Schools, to save the expense and annoyance of having to return home in case of their failing to pass our Matriculation Examination.

There are no special examinations for those who come late. If candidates present themselves after the regular Matriculation Examinations are over, on the 1st October and the 16th April, they can not be admitted without certificates.

Farmers' sons, or others following the occupation of farming, will be allowed to attend the Classes during the Winter Session, which shall count as a year, under conditions hereinafter specified.

COURSE OF INSTRUCTION.

The instruction given at the institution is embraced under two heads : a Course of Study and a Course of Apprenticeship.

1.—COURSE OF STUDY.

The regular course of study for matriculated students is one of two years. There is a special course for those attending during the winter session only, whereby, no apprenticeship being undertaken in that time, additional studies are possible, and the whole two years' course is completed in two Winter Sessions.

FIRST YEAR.

SUBJECTS :

Practical Agriculture.	Chemistry.
Veterinary Anatomy.	Botany.
Veterinary Materia Medica.	Zoology.
Physical Geography.	Geology.
English.	Mathematics.

SECOND YEAR

SUBJECTS :

Agriculture.	Economic Botany.
Veterinary Pathology.	Entomology.
Veterinary Surgery and Practice.	Meteorology.
Book-keeping.	English Literature.
Levelling and Surveying.	Political Economy.
Agricultural Chemistry.	

DEPARTMENTS OF INSTRUCTION.

1.—AGRICULTURE.

INTRODUCTION.—*History of Agriculture*—Ancient, mediæval, modern ; *Literature*—standard works, reports of societies, periodicals ; *Varieties of Farming*—dairy, stock, ordinary mixed husbandry.

SOILS.—Origin, distribution, physical properties, and classification of soils ; *Reclamation of lands*—Forest clearing—stumping, stoning, fallowing, etc.

PREPARATION OF THE LAND FOR CROPS.—Ordinary operations of tillage, ploughing, harrowing, cultivating, rolling, subsoiling, levelling, general cultivation most appropriate for the various kinds of soils.

SUCCESSION OF CROPS.—Importance and necessity of rotation, principles thereof, rotations suitable for various soils ; crops—root, forage, cereal—treated with reference thereto.

CULTIVATION OF CROPS.—The various crops ; *Cereals*—wheat, oats, barley, etc. *Leguminous*—peas, beans, etc. ; *Roots*—turnip, carrot, potato, etc. ; *Forage or Herbage*—tare, lucerne, clovers, grasses, flax, hemp—cultivation most appropriate for each ; *Seeds*—purchasing, testing, preparing, changing ; *Sowing*—kind and quantity of seed, method of sowing ; *After cultivation—harvesting—consumption*, or preparing for market, cost of production, laying land down to grass, management of grass and pasture land.

IMPROVEMENT OF SOILS AND LANDS.—Improvement by thorough ordinary cultivation, subsoiling ; *Draining*—its value, principles, various methods of draining, formation, levelling for, materials used in formation, cost and remuneration ; *Manuring*—farm-yard manuring ; application, uses, and properties of *artificial manures*—lime, plaster, salt, bones, superphosphate, nitrate of soda, etc.

BREEDING, REARING, AND FEEDING OF ANIMALS.—Horses suited for agricultural purposes, various breeds, breeding, feeding, and general management; *Cattle*—characteristics of the various breeds—Shorthorns, Herefords, Devons, Ayrshires, etc.; methods of breeding, cross-breeding, in-and-in breeding, pedigree system, rearing young stock, the fattening process, relation of food to increase, dairy management, butter and cheese management, the factory system, realization; *Sheep*—characteristics of various breeds, long wools, medium wools, short wools, breeding and management of ewe flock, winter and spring feeding, rearing of lambs, relation of food to increase; *Wool*—texture, quantity and quality, dipping and salving, quantity maintained per acre; *Swine*—characteristics of the various breeds, breeding and management of sows, fattening, relation of food to increase, bacon curing; *Poultry*—characteristics of the various breeds, general management.

IMPLEMENTS OF THE FARM.—Mechanical principles entering into their construction; ploughs, harrows, cultivators; other tillage implements, sowing machines, grass seed and manure distributors; mowing and reaping machines; hay-making and harvesting machines; threshing and dressing machines; barn implements; waggons, sleighs, carts; straw-cutters, turnip-cutters, and pulpers; implements used in stock-feeding, common, steaming; implements of less general use.

GENERAL ECONOMY OF THE FARM.—Laying out a farm, formation and management of roads and lanes; *Fences*—varieties, position, mode of construction, materials, movable fences, hurdles; *Hedges*—varieties, methods of planting, after cultivation; *Buildings*—dwellings, out-buildings, stables, barns, sheds—principles of construction, plans and specifications.

GENERAL BUSINESS OF THE FARM.—Capital necessary, values and prices of land, stock, implements and improvements, value of all kinds of labour, making of inventories, keeping of stock and produce registers; *Markets*—economical laws regulating them, customs affecting them, modes of buying and selling, common laws relating to agriculture, relation of agriculture to the other industries.

ARBORICULTURE.—Application to the American continent, different kinds of trees—occurrence, habits, uses, values—value of timber as a crop, raising of trees from the seed bed, what parts of the country should be planted, planting operations, transplanting large trees, enclosing and draining planted ground, management of trees with a view to shelter and economy.

MISCELLANEOUS SUBJECTS.

2.—HORTICULTURE.

Occasional lectures are all that are yet given in this important department. The course of practical work, however, is extensive.

3.—SCIENCE.

I.—Chemistry.

CHEMICAL PHYSICS.—Force and matter, correlation of force, properties of matter, gravity, cohesion, heat—light, magnetism—electricity; forms of matter, liquids, solids, gases.

INORGANIC CHEMISTRY.—Scope of chemistry, atomic theory, chemical affinity, the *non-metallic* elements—oxygen, hydrogen, water—its nature, occurrence, functions, states and decomposition, nitrogen, the atmosphere, ammonia, its sources and important uses, oxides of nitrogen, nitric acid and its importance to plants, sulphur and its compounds, sulphuric acid, its manufacture and uses, phosphorus, the agricultural importance of phosphoric acid, carbon, silicon, flint, sand, silicates, chlorine, bromine, iodine, etc. *The metals*—the alkalis, sodium, potassium, soda, salt; calcium, lime, plaster; lead and its compounds; iron—its ores and manufactures; arsenic—its compounds and detection—gold, silver, platinum, tin, etc., occurrence and uses, alloys.

ORGANIC CHEMISTRY.—Scope of the divisions of the science, organic compounds derived directly or indirectly from plants and animals, artificial formation of organic

compounds, classification of organic bodies and their complexity, determination of the empirical and rational formulæ of organic bodies. *Wood Spirit* and its derivatives, methyl compounds, chloroform, acetic acid and its compounds, alcohol and the process of fermentation, constitution of oil and fats, manufacture of soap and candles; *starch and sugar*, and the other amyloids and glucoids—manufacture of sugar, tartaric, lactic, citric, and malic acids. The flesh-formers, or albuminoids and their congeners; *Essential oils and resins*—varnishes, petroleum; *Vegetable Alkaloids*—quinine, strychnia; aniline dyes; urea and uric acid. *Animal Chemistry. Vegetable Chemistry.*

AGRICULTURAL CHEMISTRY.—History of the connection between agriculture and chemistry, the food of plants, the origin and nature of soils, analysis of soils, relation of different plants to the soil, composition of different crops, chemical changes during the growth of different plants, rotation of crops; manures—special and general, the composition of farm-yard manure, nature and analysis of guanos and superphosphates, other manures, feeding of animals, foods, ingredients of foods, relation of increase to composition of food, economy of food.

PRACTICAL CHEMISTRY.—Chemical manipulation—the practical testing of waters, soils, foods, superphosphates and other manures, and the preparation of the common gases and the common acids.

ANALYTICAL CHEMISTRY.—Qualitative and quantitative analysis, especially the analysis of soils, manures and farm produce.

(a) *Through all the courses, both of laboratory and experimental lectures, a constant endeavour is made to illustrate the principles of the pure science of Chemistry, on which the whole teaching is based, by Agricultural examples.*

II.—*Natural History and Entomology.*

BOTANY.—*Structural and Physiological*—Internal structure of plants, cells, and vessels; construction and development of the external parts of plants, root, stem, leaf, flower, seed, fruit; physiology of cells and vessels, chlorophyll; starch, gum, sugar, crystals, etc., movement of fluids and gases, nutrition and respiration, reproduction, methods of fertilization, hybridization, varieties, propagation, budding, division; diseases of plants, smut, rust, mildew, etc.

SYSTEMATIC AND ECONOMIC BOTANY.—Special morphology and general classification of plants, flowerless plants, mosses, ferns, fungi, etc.; flowering plants, characters of larger divisions. The orders containing important agricultural and economic plants, the cereals, grasses, roots with geographical distribution, agricultural seeds and fruits.

ZOOLOGY.—Nature of life, vital force, differences between animals and plants, differences between different animals, morphology and physiology, definition of species, origin of species, classification, characters of the general classes and orders of the *Invertebrates*, with examples. Special study of *Infusoria*, *Scolecida*, *Annelida*, and *Insecta*. General characters of the *Vertebrates*—the various orders, with morphological and physiological distinctions of each, illustrated by common examples. Special study of the families of *Aves*, containing the insectivorous birds, and the families of the *Mammalia*, containing all the various farm animals. Comparative anatomy and physiology of farm animals.

ENTOMOLOGY.—Structure and physiology of insects, metamorphoses of insects, senses of insects, insects injurious to vegetation, to growing plants, to fruits—the apple, plum, pear, peach, small fruits, etc.

III.—*Geology, Physical Geography, and Meteorology.*

GEOLOGY.—Geological epochs, classification of rocks, structure, stratification, cleavage, foliation, dip, fault, denudation: elevation and depression of land; disintegration of rocks by aqueous and atmospheric agencies, formation of soils, Canadian geology.

PHYSICAL GEOGRAPHY AND METEOROLOGY.—Connection between physical geography and geology, distribution of land and water, superficial configuration of Ontario, theory of wells and springs. *History and Scope of Meteorology*—weight of atmosphere, how

ascertained ; *barometer*—various kinds, manipulation ; *Temperature*—how observed and calculated ; *thermometer*—varieties, Fahrenheit, Centigrade, etc., use of each, manipulation ; solar and terrestrial radiation, moisture of the atmosphere ; mists, fogs, clouds ; rain, snow, hail ; winds and storms ; miscellaneous, causes affecting the climate, influence of climate on vegetation.

4.—VETERINARY SCIENCE.

ANATOMY AND PHYSIOLOGY OF THE DOMESTIC ANIMALS.—Horse, ox, sheep, pig. Osseous system, muscular system, syndesmology, plantar system, odontology, digestive system, circulatory system, respiratory system, urinary system, nervous system, sensitive system, generative system, tegumental system.

VETERINARY PATHOLOGY.—Osseous system, giving the nature, causes, symptoms, and treatment of the various diseases of bone, as splint, spavin, ringbone, etc.

Muscular System—Nature, causes, symptoms, and treatment of flesh wounds, etc.

Syndesmology—Nature, causes, symptoms, and treatment of bog spavin, curb, and other diseases of joints.

Plantar System—Nature, causes, symptoms, and treatment of corns, sand-crack, and other diseases of the foot.

Odontology—Describing the diseases of the teeth ; also the mode of determining the age of the animals by the same.

Digestive System—Nature, causes, symptoms, and treatment of spasmodic and flatulent colic, inflammation of the bowels, acute indigestion, tympanitis in cattle, impaction of the rumen, and many other common diseases.

Circulatory System—Describing the diseases of the heart and blood vessels.

Respiratory System—Nature, causes, symptoms, and treatment of catarrh, nasal gleet, roaring, bronchitis, pleurisy, inflammation of the lungs, etc.

Urinal System—Nature, causes, symptoms, and treatment of inflammation of the kidneys, etc.

Nervous System—Nature, causes, symptoms, and treatment of lockjaw, string-halt, etc.

Sensitive System—Nature, causes, symptoms, and treatment of the diseases of the eye and ear.

Generative System—Nature, causes, symptoms, and treatment of abortion, parturition, milk fever, etc.

Tegumental System—Nature, causes, symptoms, and treatment of scratches, sallenders, mallenders, parasites, and other diseases of the skin.

MATERIA MEDICA.—Giving the preparation, actions, uses, doses, of over one hundred of the principal medicines used in Veterinary practice.

GENERAL SUBJECTS.—The external form of the horse, thoroughbreds, half-bred hunters, harness animals, draught animals. The external forms of stock, breeding, selection of animals, crosses, transmission of hereditary diseases ; spavin, splints, side-bones, ring-bones, grease, blindness, roaring, etc., and their remedies, sterility, abortion, general management to produce successful gestation, parturition, natural and preternatural presentations, their treatment. The management of young stock, weaning, feeding, method of preventing blood disease. The feeding of animals, ventilation, water, stabling. The influence of climate upon animals.

DEMONSTRATION OF ANATOMY IN THE DISSECTING-ROOM.

5.—ENGLISH AND POLITICAL ECONOMY.

ENGLISH.—*Review of past school work.*—Study of etymological, syntactical, and rhetorical forms of the English language, history of its formation, elements entering into it, its connection with other languages. Analytical study of one of Shakspeare's plays, and of extracts from some of the other English classics each year. *English composition*—the sentence, the paragraph, rhetorical figures, their use and abuse, species of composi-

tion, qualities of style, varieties of style. Essay writing, familiar and business correspondence.

POLITICAL ECONOMY.—Wealth, labour, capital; production, distribution, exchange, government, and the position that agriculture holds in each; relation of agriculture to all the other industries of a nation.

6.—MATHEMATICS.

MATHEMATICS.—*Arithmetic*—Review of past work in arithmetic, with special view to farm accounts—tables of weights and measures, proportion, interest, discount, partnership, square and cube roots; *Mental Arithmetic*; *Mensuration*—the mensuration of every kind of surface, including the quantity of land cultivated by various machines, the surface occupied by different crops, the measurement of solids, including the contents of tanks, ditches, wells, manure heaps, walls, the material for roads, timber, etc. *Surveying* in its commoner branches, fields surveyed with the chain and cross-staff, heights and distances found by the use of the theodolite, levelling practised. *Mechanics*—methods for calculating the weights of different materials, the units of work performed by various agents in the execution of particular works, the strength of materials, the mechanical powers, friction, the steam engine, etc. Those parts of dynamics which have reference to agricultural machinery, such as centrifugal force, accumulated work.

II.—COURSE OF APPRENTICESHIP.

The pupils are daily distributed to each of the following departments:

1. The Live-Stock Department.
2. The Field Department.
3. The Horticultural Department.
4. The Mechanical Department.
5. The Experimental Department.

They are taught the manner of performing the various operations in each department by the instructor or his assistants in that department; and being distributed alternately to each, it is expected that at the end of two years a thorough apprenticeship will have been served.

The instruction received in the class-room is, as far as possible, illustrated and exemplified in the fields, yards, and shops. The following may be taken as a few of the operations, in the performance of which apprenticeship is served:

FIELD DEPARTMENT.—Cleaning, harnessing, and management of horses, ploughing, harrowing, cultivating, drilling, subsoiling, sowing broadcast and by drill, planting, hoeing and grubbing, haying by scythe and mower, harvesting by cradle and reaper, stoning, threshing, winnowing, marketing, draining, levelling, land measuring, stumping, logging, chopping, etc.

LIVE-STOCK DEPARTMENT.—Cutting, pulping, steaming, mixing, feeding, cleaning, and general management of cattle. Feeding, lambing, shearing, castration, dipping, salving, hurdling, and general management of sheep. Feeding and general management of other stock.

HORTICULTURAL DEPARTMENT.—Digging, ploughing, raking, seeding, planting, hoeing, mowing, harvesting, storing, and general management of vegetables, flowers, and lawn. Pruning, grafting, budding, mulching, cleaning, harvesting and storing, and general management of an orchard. General management of propagating-houses, green-houses, vinery, nursery, hedges, walks and roads, etc.

MECHANICAL DEPARTMENT.—Planing, sawing, nailing, grooving, matching, mortising, framing, and general use of commoner mechanical tools. Fencing, hurdle making, gate making, and management of general farm improvements. Repairs of all farm buildings, implements, machines, etc.

SESSIONS AND EXAMINATIONS.

For those taking the regular course there are two Sessions in the year—a Winter and a Summer Session. The former commences on the 1st of October, the latter on the 16th April.

There is a vacation at the end of each Session.

There are three examinations in the year, which every student is required to pass, on the lectures of the class-room and on the practical work in the outside departments:—At Christmas, on the work of the Fall Term; at the end of March, the work of the Fall and Winter Terms; and at the end of June, on the work of the Spring Term.

For those taking the special course there is but one Session—the Winter Session—extending from the 1st October to the end of March. To those who pass the requisite examinations, not only in the regular studies, but in the special ones likewise, this Session counts as a year, and is so designated.

DIPLOMAS.

A diploma is given to each student who completes his course of study, and passes satisfactorily all examinations, both on the subjects contained in the curriculum, and on the work of his apprenticeship.

RESIDENCE, LABOUR, FEES, REMUNERATION, ETC.

1.—REGULAR COURSE.

It is desirable that all students taking the regular course should reside in the building. As the city, however, is distant but a mile and a half, students may board in it and attend lectures.

The number of hours of labour for regular students varies with the season of the year, from three and a half to five hours a day. In the months of July and August, when there are no lectures, the number is nine and a half hours a day.

Tuition fees, always paid in advance, \$25 a year for ratepayers and *bona fide* residents of the Province of Ontario; for all others, \$50 a year.

Board, lodging, and light, with the washing of towels and bed linen, \$2.24 to \$2.38 a week.

Washing, 30 cents per dozen pieces.

Allowance for labour, four to ten cents an hour, according to its value as estimated by the Farm Superintendent and his foremen.

By this arrangement the cost of education is reduced to a minimum:

- (1) The entire cost to an Ontario farmer's son, able and willing, with considerable experience in farm work, is \$50 to \$65 a year for *board, washing, and tuition*.
- (2) To an Ontario Student without any previous knowledge of farming, \$55 to \$75 a year for *board, washing, and tuition*.
- (3) To non-residents, \$75 to \$100 a year for *board, washing, and tuition*.

2.—SPECIAL COURSE.

The special course, as stated above, commences on the 1st of October and ends 1st of April. It is intended for farmers' sons, or others engaged in that occupation, who desire to attend lectures during the winter, and return home in time for the spring work on their own farms. Such students, doing little or no manual labour, are enabled to take a whole year's lecture in the Winter Session, which counts as a year.

Tuition fees, always in advance, \$25 a year for ratepayers and *bona fide* residents of the Province of Ontario; for all others, \$50 a year.

Board, lodging and light, with the washing of towels and bed linen, \$2.24 to \$2.38 a week.

Washing, 30 cents per dozen pieces.

No opportunity of defraying expenses can be promised to students taking this course, but if work be required of them they will be paid at the same rates as regular students.

GENERAL RULES.

I.—STUDENTS ARE REQUIRED—

1. To render cheerful and willing obedience to orders.
2. To conduct themselves in a gentlemanly and orderly manner at all times.
3. To avoid all noisy or boisterous conduct in or about the building.
4. To observe neatness of dress at prayers, meals and lectures, and tidiness in their rooms.

II.—THE FOLLOWING PRACTICES ARE ABSOLUTELY FORBIDDEN :—

1. Swearing, improper language, and gambling.
2. Use of intoxicating liquors, cards, or fire-arms.
3. Use of tobacco while on detail, in or about the building, or in any place except in the smoking room.
4. Entering domestic or private apartments without permission.
5. Absence without leave.
6. Cutting, marking, or in any way defacing the College buildings or furniture.

GENERAL REGULATIONS.

1. All students who reside in the building are under the charge of the President.
2. A register is kept of the attendance of students at prayers, work and lectures.
3. All students must attend morning and evening prayers, unless exempted from doing so in consequence of the objection of their parents and guardians.
4. They are required regularly to attend their respective places of worship on Sabbath forenoon.
5. No student is allowed to be absent from the institution after seven o'clock in the evening, except by permission of the President.
6. Students are provided with everything in the shape of furniture, bedding, towels, etc., that may be requisite, but each is accountable for every such article placed at his disposal.
7. Every student damaging or breaking anything is required to report the same, that the value of the repairs may be charged to his account.
8. The morning bell is rung at 6 a.m. : breakfast, at 6.30 a.m. : farm bell, at 7 a.m. ; school bell, at 9 a.m. ; farm bell, at 12 noon ; dinner, at 12.30 p.m. : farm bell at 1.30 p.m. ; school bell, at 2 p.m. : farm and school bells, at 5 p.m. ; tea, at 5.30 p.m. : school bell, at 7 p.m. ; bell for evening prayers, at 9 p.m. ; lights out at 10 p.m., and doors locked at 10.30 p.m.
9. The President is authorized to impose fines and other penalties for the infraction of rules and regulations.
10. No student whose moral conduct, industrial or intellectual progress is unsatisfactory to the staff, will be allowed to remain at the institution.

GENERAL REMARKS.

A few general remarks on the appliances and advantages possessed by this institution for training young men for agricultural pursuits may be given in conclusion.

CLASSES OF STUDENTS.

There are in our Province, as a general rule, at least three classes of young men whom an institution of this kind can benefit. The first class are those who, from our cities and towns, or from other countries, with or without a small capital at their command, desire to serve an apprenticeship at farm work. The second class is farmers' sons, or the sons of those closely connected with that occupation, who wish to complete their education before commencing their life-work. Both of these are provided for in our regular course. And lastly, there are farmers' sons or others engaged in farming who desire to obtain an agricultural education, but cannot remain with us during the summer months. These are provided for in the special course. By taking that course, they can do a year's work in the winter session, be back on their own farms in time to commence their spring work, and return to College again in the fall.

TEACHING APPLIANCES ON THE FARM.

The farm itself is being gradually laid out, cleaned, and drained, and the students assist in these operations. The best and most approved farm implements and machinery are used. The possession of seven breeds of cattle, six of sheep and three of swine, is in itself an important advantage for the purpose of instruction. Besides this, there are in the immediate neighbourhood several herds which are frequently inspected by the students. In the adjacent city, monthly fairs, fat cattle shows, and a central exhibition are held. All of these are visited by the students, who regularly report on what they have observed.

EXPERIMENTS.

A portion of the farm has been laid out in experimental fields and plots, and regular systematic experiments with varieties of grasses, cereals and roots, with different manures and different modes of cultivation, are carried on. In these the second year students, as far as practicable, are engaged. Besides these field experiments, others in the feeding of live stock are made during the winter, to test the several breeds and the comparative values of different kinds of food. The benefit of such experiments to the Province need not be pointed out. The discovery of one or two really good varieties of wheat, oats or peas would not only cover all expenses, but pay for the place itself in a couple of years by their value to the country. Without mentioning this, however, it will be seen that second years' students are trained in the modes of carrying out experiments.

TEACHING APPLIANCES IN THE SCHOOL.

These are constantly being added to, although in the meantime they are not so numerous as might be desired. Especially is the want felt in the department of the Professor of Chemistry, for as yet there is but a small working laboratory in connection with the institution. Appliances in school are usually the growth of years, and with five teachers—masters of their subjects—the College may be said to be fairly equipped.

VETERINARY DEPARTMENT.

This most important department has been fully organized and is doing good work. A complete skeleton of a horse and all the principal bones of ordinary farm animals have

been provided for the class-room. When an animal dies from disease or any other ailment, it is dissected, and the cause or causes of death sought for and pointed out in presence of the classes. Thus the work is made as practicable as possible.

LIBRARY AND READING-ROOM.

The library is well selected, and, though small, is being constantly augmented. The reading-room is furnished by the College with daily and weekly newspapers, with some half-dozen general periodicals, and the leading agricultural papers of Canada, the United States and Great Britain. Several papers are likewise provided by the Literary Society.

ADVANTAGES OF THE COURSE.

Besides becoming fairly skilled in the work of a farm, the student takes part in the cultivation of a garden, and thus increases his knowledge and improves his taste in a very important direction. He also acquires skill in the use of tools, so that afterwards he is not only able to make his own repairs, but knows when such work is properly done. He sees for himself the effects of various rotations and different modes of cultivation, and becomes acquainted, on the experimental ground, and in the class-room, with many varieties of grasses, grains, roots, and manures. The different breeds of cattle, sheep and swine, of common use in Canada, become familiar to him from daily contact with them; and the excellencies and defects of each he learns by lectures in the class-room, and by reference in the yards. He is taught how to keep live stock registers, accounts of field cropping, and regular farm accounts. By personal observation he learns the routine of auction sales, of ordinary fairs and stock markets, and of the common grain market. He becomes acquainted with the prices of stock, implements and produce, with the cost of building and improvements—in a word, he is prepared to transact the *business* of a farm. He obtains in the Veterinary Department a knowledge of the structure and functions of farm animals, and the most approved methods of treating and preventing the ordinary diseases to which such animals are liable. The study of the relations of the plant, the soil, and the animal to each other, and to his profession, under the heads of Botany, Chemistry, etc., not only shows him the reasons for the rules of the best farm practice, and enables him afterwards to discover other such rules, but likewise forms in him habits of reasoning closely, systematically and correctly, which cannot fail in after-life to make him a better citizen. And lastly, by this as well as by the teaching in the class-room, by reading the standard works in the library, and the newspapers and periodicals in the reading-room, by contact with his fellow-students, and by discussions carried on with them in their Literary Society, his mind is sharpened and strengthened, his views widened, and his power of thinking and his ability to express his thoughts greatly increased.

If the student be careless, thoughtless, or lazy, few of those advantages will be reaped; but if he be attentive, energetic and diligent, the majority of them will undoubtedly be secured.

JAMES MILLS,
President.

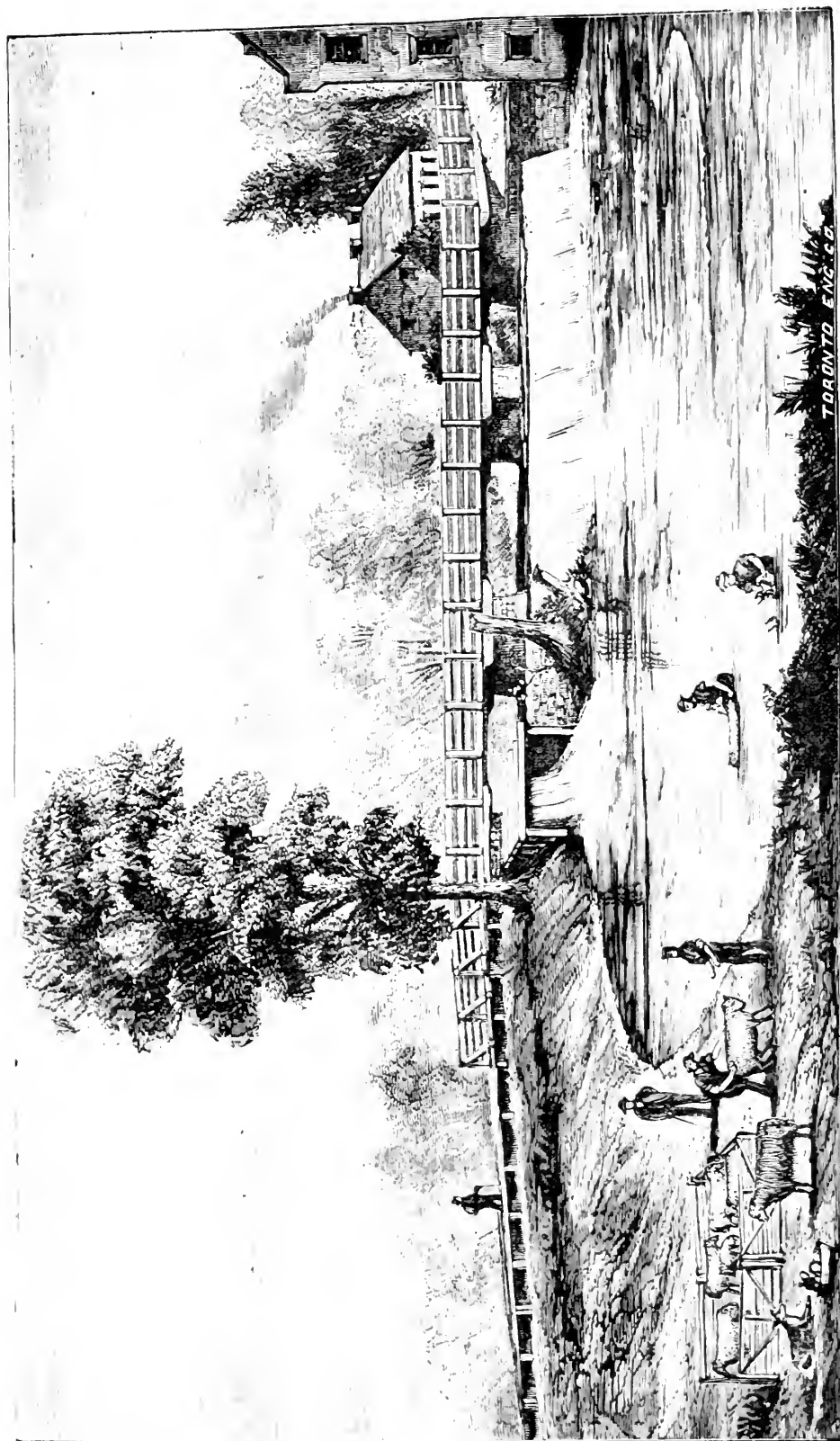
R E P O R T
OF THE
PROFESSOR OF AGRICULTURE
AND
FARM SUPERINTENDENT.

ONTARIO AGRICULTURAL COLLEGE AND EXPERIMENTAL FARM,
GUELPH, 31st December, 1881.

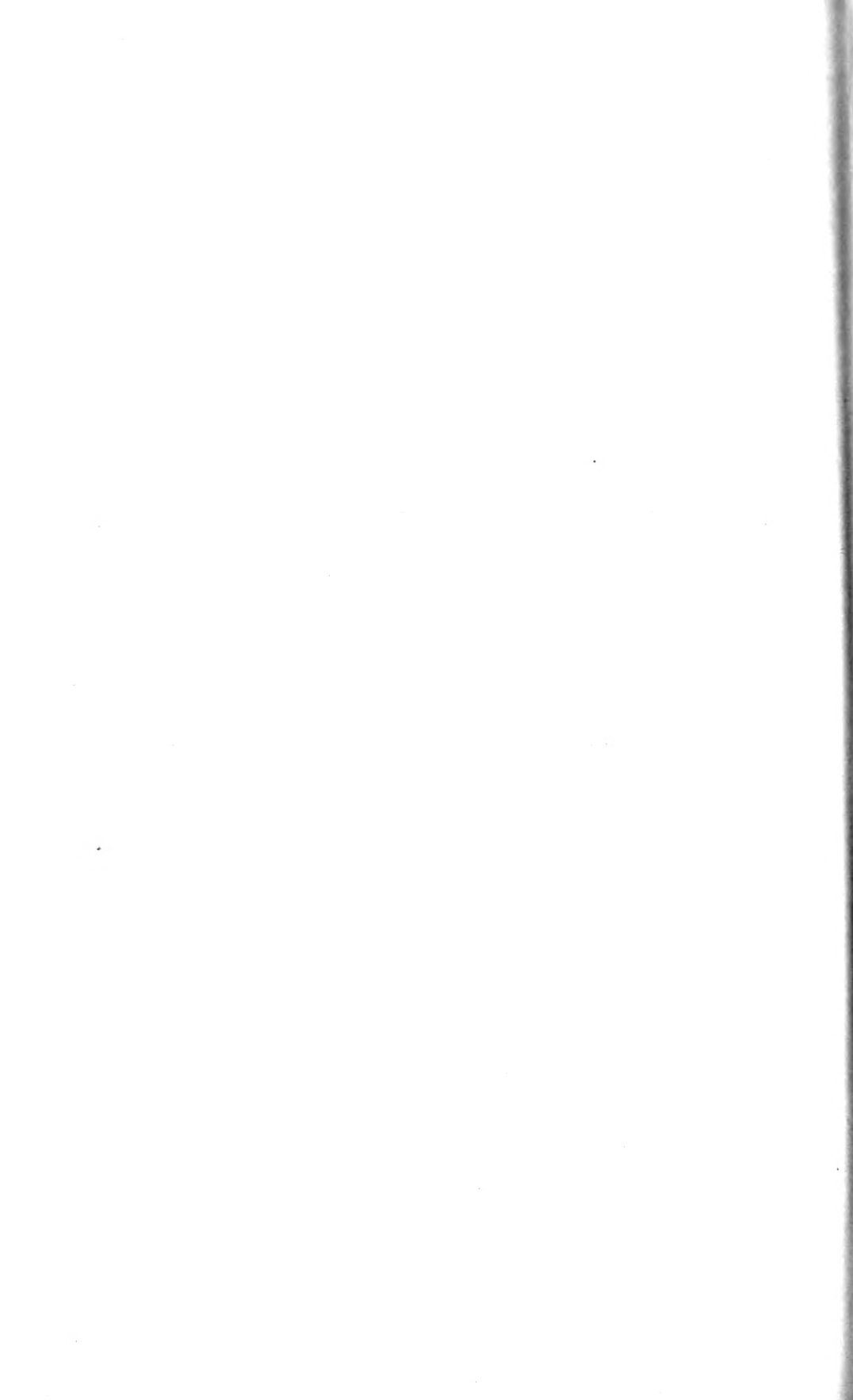
*To the Honourable S. C. Wood,
Commissioner of Agriculture.*

SIR,—As every successive report of any progressive concern is expected to be more interesting than its predecessor, and as those from this Institution during the past six years have ranked fairly well in this regard, it becomes a somewhat heavy matter to build up the status of the seventh.

You will allow me first of all to say how little I am able to do well in showing what is being done in several of the departments under my charge. The prolific field of Horticulture, for example, should receive a fuller handling, practically and scientifically, than it can possibly do from me. On the question of Fruits alone, we should already be telling the Province and the world how much can and cannot be expected under various conditions of soil, season, and management, not only from all the established varieties, but also from others that may be strictly experimental outside of ourselves, and those that are, or should be, ours experimentally. I think we are not bright in this line—good and reliable as our practical gardening unquestionably is. It is surely part of our duty to point not only the farmer's son, but the professional man and the deeper botanist, to such aspects and bearings of this the only "model culture" extant, as should elicit the commendation of even our enemies—if we have any. So also in regard to Entomology, which, were it as well reported upon in all its relations to our professions as it is taught by Professor Panton, would unquestionably be of almost incalculable value to the Province, for it ought to exist as a division of our Experimental Department, having all its daily and monthly life minutely, reliably, and plainly told, so that every grower of crops would know what to encourage and what to destroy, according to the guide thus established. Then, again, I think it is our place to be statistically wise, in the sense of being able monthly to prejudge what kinds and quantities of products the Province is likely to offer for home and foreign markets. This, I am aware, is a big thing, involving labour, great care, and the special study of a competent man, but it is one that no progressive country can overlook, and to a large extent Ontario has already committed herself in this regard by the rich issue of the Agricultural Commission. Our valued ex-President Johnston opened the gate of this field some years ago by drafting a line of work which I understand had your approval, and now that our College is in the hands of the farmers themselves, what they are doing should be our special work and their special interest. Thus much suggestive.



SHEEP WASHING AT THE ONTARIO EXPERIMENTAL FARM.
(GOW'S DAM ON RIVER SPEED.)



My introductory subject this year is, Our School in relation to the Cultivation Trees in the Province ; as, although I have in previous reports endeavoured to give some idea of its immense value, no definite suggestions have been made, nor any future work made clear.

The general importance of the subject, and its special application to Canada, is necessarily our first consideration, but it is one that has been so ably handled by evidence before the recent Agricultural Commission, that little more is necessary to impress its political standing upon the Government. The great points of trees or no trees, of retained moisture or rapid evaporation, of irregularly or regularly distributed rainfall, of unchecked storms or amelioration, of more or less temperate temperatures, and of the secondary but telling ones of ornament and cropping revenue—all go to make up a chapter of keen interest in our yet but short history as a nation.

Were evidence needed either to convince or stimulate us to action, the fact of what is being done in the conservation and replanting of forests in other countries should awaken both our pride and deep interest, as such lessons are plentiful in India, Australia, and the neighbouring Republic. There, Forestry is a profession and a Governmental department, systematically conducted by able officers, who are liberally supplied, first, in the item of experiments, and then in the establishment of extensive re-clothing of lands chosen by virtue of judgment based upon these and other known facts acquired by experience, or as shown by Nature herself.

When we desire to bring this matter right home to the farmer and his son here, the story takes seven distinct heads :

1. Shelter for crops.
2. Shelter for grazing animals.
3. Shelter for dwellings.
4. Regulation of temperature.
5. Regulation of rainfall.
6. Ornamental purposes ; and
7. As a cropping investment.

The area and value of the forest lands of Canada are still of great magnitude ;—indeed, of such magnitude that all the reliable information we possess from the brief notes of surveys stands as evidence of our ignorance of its variety, wealth, and extent, because any survey partakes so much of the character of straight-line testing that whole blocks of hundreds of acres of many kinds of our best timber lie untouched and unknown—at least to Government. It is surely within the scope of a reasonable outlay, and not many years' work, that the country should hold one map showing the principal tree crops on every surveyed lot, as well as on every outlined township, district, and limit. While we know intuitively that we are wealthier than we appear to be, it will give us no better standing in the world's market to make a story about it without actual inspection. Besides, when we talk scientifically, as we must do, in respect of forest influences upon many things ere practice goes afoot, it is most material to be thoroughly familiar with the existing condition of our forests as regards first, second, or any subsequent natural growths, and how far they are likely to subserve the ends in view.

The requisite proportion of tree surface to that under agriculture is another of the studies yet little understood by scientists, and cannot, so to speak, be handled practically with any precise measure of reason until further experiments point to safe data ; but, from the extreme of overclearing on the one hand, to that of too much forest on the other, there is safe ground for *no delay* on the part of any Government. Of course this would bring up the allied point of what parts of the country should be conserved and what parts replanted, subject to the regulation of appropriate positions and adaptability of soil and climate in each particular example.

It should be one of the particular duties of the Professor of Arboriculture to educate the students of this Institution in regard to the suitability of certain kinds and *forms* of trees for special purposes—whether for field clumps, shelter belts, road-side shade, neighbourhood of dwellings, or for more extensive planting—in addition to the management

of them in all their detail from the seed-bed, transplanting in the nursery, preparation of land for planting, their annual maintenance, thinnings and their value, enemies to and diseases thereof, to the grazing of replanted lands, and the ultimate realization of the matured crop.

Thus should we be in a position to advise our Legislatures on the great national problem of the special and general conservation and replanting, by which it would be shown that enclosing, draining, regulation of fires, animal trespass, and supervision stood as items of public expenditure of the first class, so that one of the first of their duties is the establishment of Forest Departments, and the appointment and duties of a Conservator of Forests for each Province.

II.—THE FIELD.

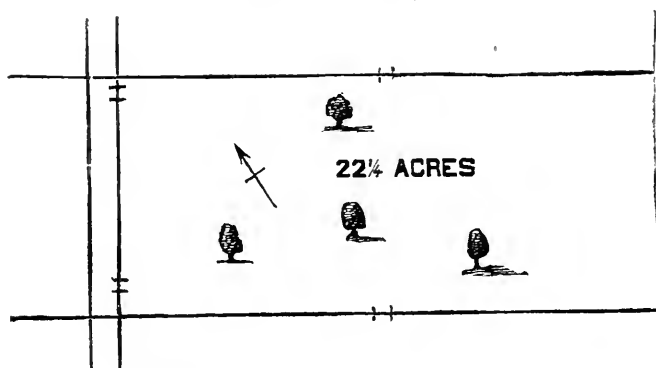
(1) FARM CROPPING.

We have had so much of the purely practical in our previous reports under this head, that I am disposed to offer something with a scientific touch, as appropriate to our collegiate position and out of compliment to my fellow-labourers—be he chemist, botanist, entomologist, or practical farmer.

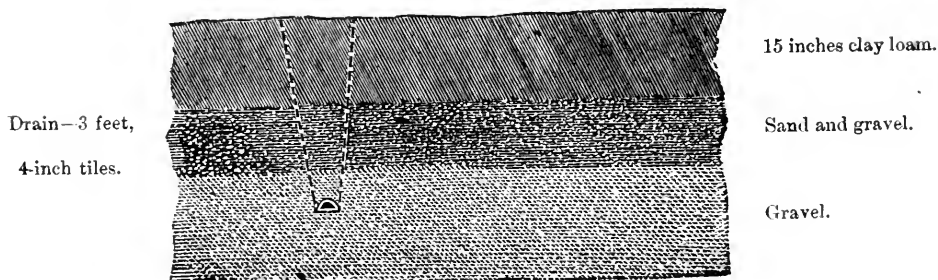
Looking upon a circle of crops by our seven shift as representative of a system that is best adapted to the restoration of an exhausted and dirty clay loam—of which we had so much in 1875—I shall handle Field 8, because of its average position to the whole farm, and of its fairness physically and productively, and because of its having completed the circle referred to.

This field has one uniform almost level surface, with sufficient fall to the west for artificial drainage, which was effected in 1874 when in roots. The soil is a clay loam, neither heavy nor light, to an average depth of fifteen inches, resting upon a deep bed of almost pure gravel. It possesses four indifferent shade trees, and is watered from a well on the south-west corner.

FIELD 8 (1881).

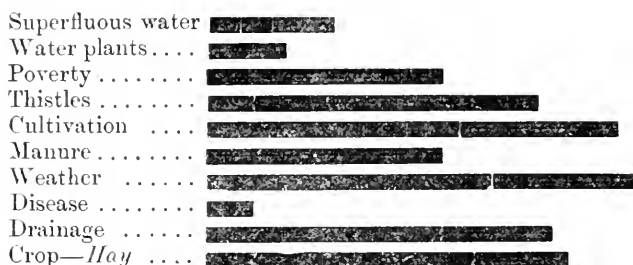


Section of Field 8, showing drains and soils.



water plants, poverty, and thistles, averaging nearly as much as cultivation, manure, weather, drainage, and crop, the position was not a model one.

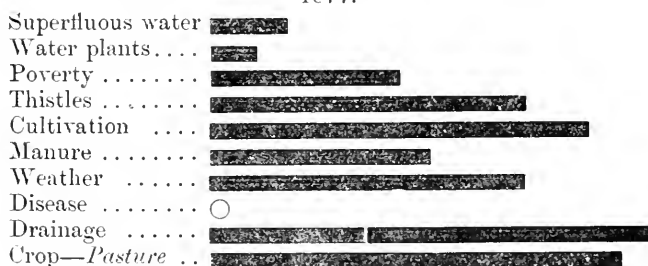
1876.



It is one of the curious things of farming in a country with extremes of climate that many good crops are got under conditions adverse to all notions of propriety in cultivated plant life, and it is because of this prominent fact that permanent improvements and thorough cultivation are yet so scarce in new countries—making so many men lazy, being “too well off,” or living well upon the average of things. Depending upon peculiar conditions of climate, which affect both soil and immediate atmosphere favourably for the time being, four crops in ten will be safe to build upon. But then, there is no reliance; there is liability to a four years’ bursting of barns and a six years’ famine. However, this striking climatic circumstance points to another most important one in the present heat of special manures. Much as we do value and practise the association of mineral superphosphate, gypsum, and bone-dust, with thorough cultivation, systematic rotation, and farm-yard manure, there is no denying that a very great deal of the help of these specials is delayed or lost by, to them, unpropitious weather. So then, after all, the physical condition of things is probably as much or more important than food supply to crops.

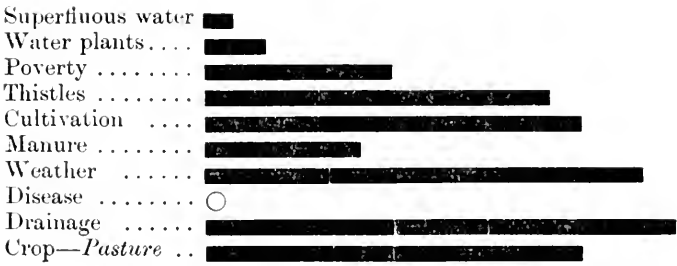
There was a good catch of grass and clover in 1876 amongst all the evils, though of course we could already speak about a comparatively rich surface and some drainage effects, with good cultivation.

1877.

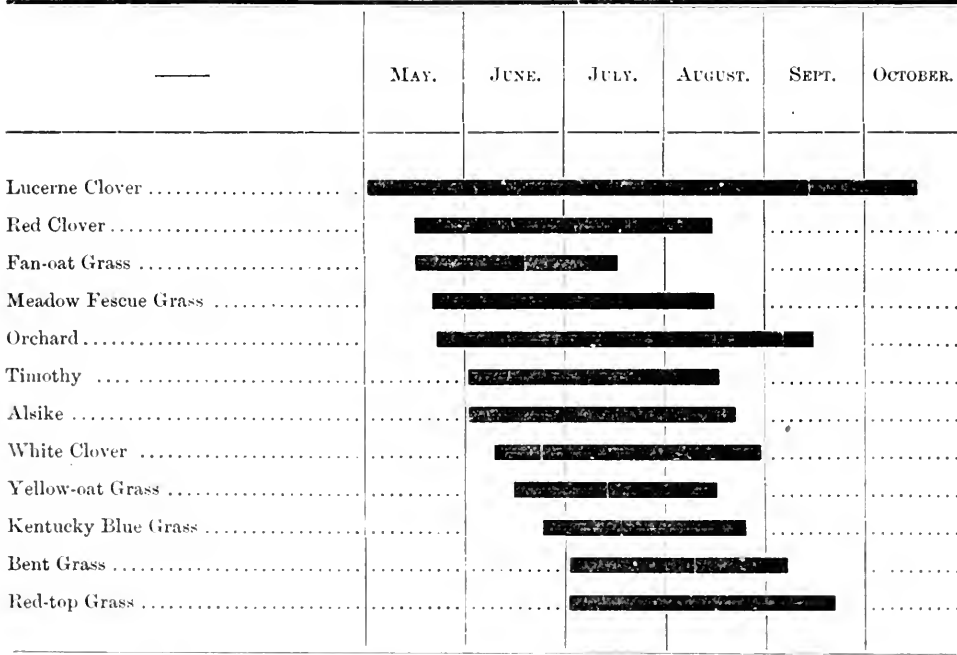


Much hay-making is one of the weaknesses of American farming. We can understand the reasonableness of the practice upon comparatively new land, where richness has to be, as it were, roughly handled in order to proper subjection; but when land is under regular drill there is no excuse whatever for taking three and four years’ crops successively of *grain*. Cereals are grasses—grasses are grain producers when they are allowed to mature their seed, and therefore very exhausting upon any soil. In the removal of potash from the soil our form of hay is more hard than that by an equal weight of wheat with its straw, and very much more so in lime. Wheat, however, removes more magnesia, phosphoric acid and silica, and about equal proportions of soda and sulphuric acid. Altogether, then, we trifle with no easily-fed crop when we are tempted by a grand catch of timothy and clover that offers its two tons per acre for half the rotation.

1878.



The fact of timothy being a June plant, and repeating its growth no better than some other first-class grasses, under pasture or elsewhere, should impress the country more than it seems to do. In place of having our animals waiting before June and after July, as well as receiving no *change* of food, upon our valuable cultivated hay, observe the ease with which nearly all farmers could overtake the whole or part of the following :—



The diagram shows the *reliable* times of each of the grasses and clovers, and, of course, depending upon season and other favourable conditions, they may be extended further into the autumn. Should exception be made to the very large number of grasses and clovers for a rotation of hay and pasture, it is plain that red clover, timothy, orchard, Kentucky Blue and red-top would alone make a rich succession of growths. At the Experimental Farm we are *now* using for a seven course :—

Timothy	6 pounds.
Red-top.....	2 "
Orchard.....	4 "
Red Clover	4 "
Alsike Clover	2 "
White Clover	2 "

20 pounds per acre.

Which we anticipate will meet all our requirements in conjunction with a large number of direct green fodders.

All the twelve varieties of grasses and clovers above-named are thoroughly reliable in Ontario, as tested by our own six years' experience.

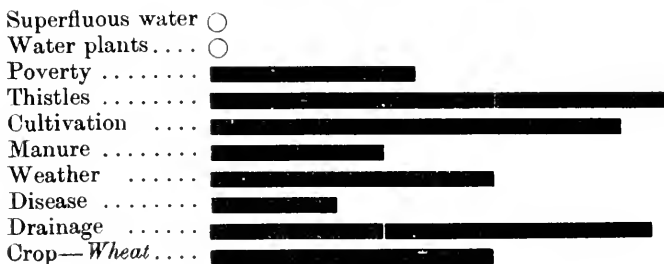
1879.



The day we are able to prove conclusively to our farmers and the world that Ontario can grow all her own grain for all her own cattle and sheep fattening, that day will be our experimental victory, and our national independence thus far. Our work to date shows strong evidence in favour of peameal as against cornmeal in finishing beef and mutton for the butcher, and, as Ontario's climate generally cannot always reliably produce the kind and quantity of corn required, the items otherwise are clearly in favour of peas, which luxuriate all over. There is, of course, no occasion to make notes of comparative production per acre in this example; and all that need be discussed is the present insect destruction of the pea crop.

There is no use of trying to stop the infliction, in districts where it has existed for years, by advocating the non-cultivation of the crop, because every farmer will not do so "all at once," so as to stamp-out, which no doubt would be the most certain plan. Statute enactment is necessary for any work of this character. There are many parts of our Province, however, where the pea weevil is unknown, and consequently we should endeavour to save them as well as clean the others. Farmers, we say, will not give up voluntarily the growing of peas, as even half a crop is too valuable in cattle-fattening nowadays, but no doubt were *every one of them* seriously advised to *grind the grain* shortly after harvesting, so as to *kill every insect*, the trouble would speedily cease. It is well known the immature bug remains in the pea until the approach of next spring, and, if in a warm granary, matures much sooner, so that *fall grinding* would catch every one. What more is needed? Thus, new seed, from clean districts, would be a necessity. A single recommendatory notice from our Agricultural Department next year by the hands of every Assessor to every farmer of every infected district would be enough. In our own practice this year we threshed thirty-three acres of peas during the first week, and ground them the second week of September, by which, irrespective of the individual stamping-out, we consider we have gained 150 bushels in extra weight over what we would have realized had grinding been delayed until the bugs had matured themselves by using more grain.

1880.



I am clearly of opinion that there are very few examples in this country of what is usually understood as exhausted or worn-out land—that is, land that will not grow any sort of crops profitably under ordinary cultivation. Practically we have no such land in Canada, because we have not been in the habit of taking a succession of different crops unaided by manure, whereby complete exhaustion of plant foods can only be effected. What we have really been doing in the way of exhaustion was a successive cropping with one sort, and therefore but the removal, very much only, of what was needed by it and them, which, while certainly large and in variety, did not leave a fruitless soil for other crops widely differing in most of their requirements. I do not mean to infer that no damage was done, but that an actual wearing out was not done—leaving nothing for others after such mismanagement. In place of saying exhausted and worn out, it would be more appropriate to say miscropped and impoverished.

1881.



I am unable to understand how any soil can be maintained in the highest state of fertility without a division under root cultivation. We know the value and importance of a division under cultivated corn; what a bare fallow, or rest, means, and what clover can do; but no form of thorough cultivation, cleaning, manuring and surface rest, is so reliable as by turnips and mangolds. This is certainly no new statement to the Canadian farmer, but in many cases it is a doubted one, and entirely denied in others. What is usually implied in the raising of a root crop?

- Fall manuring (farm-yard).
- Fall ploughing.
- Spring ploughing.
- Grubbing.
- Harrowing.
- Rolling.
- Harrowing.
- Rolling.
- Special manures.
- Drilling.
- Horse hoeing.
- Hand hoeing.
- Horse hoeing.
- Hand hoeing.

This appears formidable, and it certainly means no play. It means a first-class fallow and the securing of twenty tons per acre of a material that converts the winter months into a soiling with green fodder,—freshening all animal life, enabling the farmer to use up much roughness of other materials that would otherwise become less valuable, adding immensely to the manure pile and cheapening keep sixty per cent. I do not go the length of those who argue that were no crops obtained—that is, in the event of turnips being a failure—all the attendant operations as above specified more than repay the cost;

but I do affirm, after twenty-two years' practical experience, that a stock farm is a bare, miserable affair without roots.

Thus, then, from the unpropitious conditions of 1875, our field has become, with one exception, a cropping subject of high value. That exception is *thistles*. I have to confess to being unable, in every example, to eradicate this enemy by root cultivation. Much has been said about thistles on this farm. Do I not say enough for the management when I now affirm that comparatively no thistle has been allowed to mature its seed during the past six years, and that they are cut over three and four times a season? We have had to take to bare summer fallowing in the worst cases.

2.—CROPPING RESULTS, 1881.

From April to September inclusive make up all our season of seeding, growth, and of the maturing and harvesting of crops. April and May for seeding; June and July for growth and maturing of cereals, hay and peas; August for harvesting these, and September for maturing of roots. The temperature of our seeding season was very high—as high as $84^{\circ}.5$, and yet as low as $22^{\circ}.7$, which of course brings the monthly mean down to 48° . But a mean of 48° for April and May is really high: good, therefore, for cultivation and seeding if followed by genial showers for germination. The rainfall of the seeding months was very small—only 1.39, not enough for the best progress, even though spread over fifteen days as it was.

June and July, as for growth principally and part maturing of crops, were characterized by much drought, with high winds and a low rainfall. Yet the rain was distributed over twenty days. The mean temperature of the period was actually 63° , in no instance reaching frost, and as high as $91^{\circ}.5$. Roots suffered seriously. August kept up the heat and sultriness, thus capping the climax for roots, pastures and water; rainfall only $2^{\circ}.15''$ over five days, and mean temperature as much as $72^{\circ}.7$. A grand harvesting month for all kinds of grain nevertheless. September was the warmest in Ontario records, also with little rainfall.

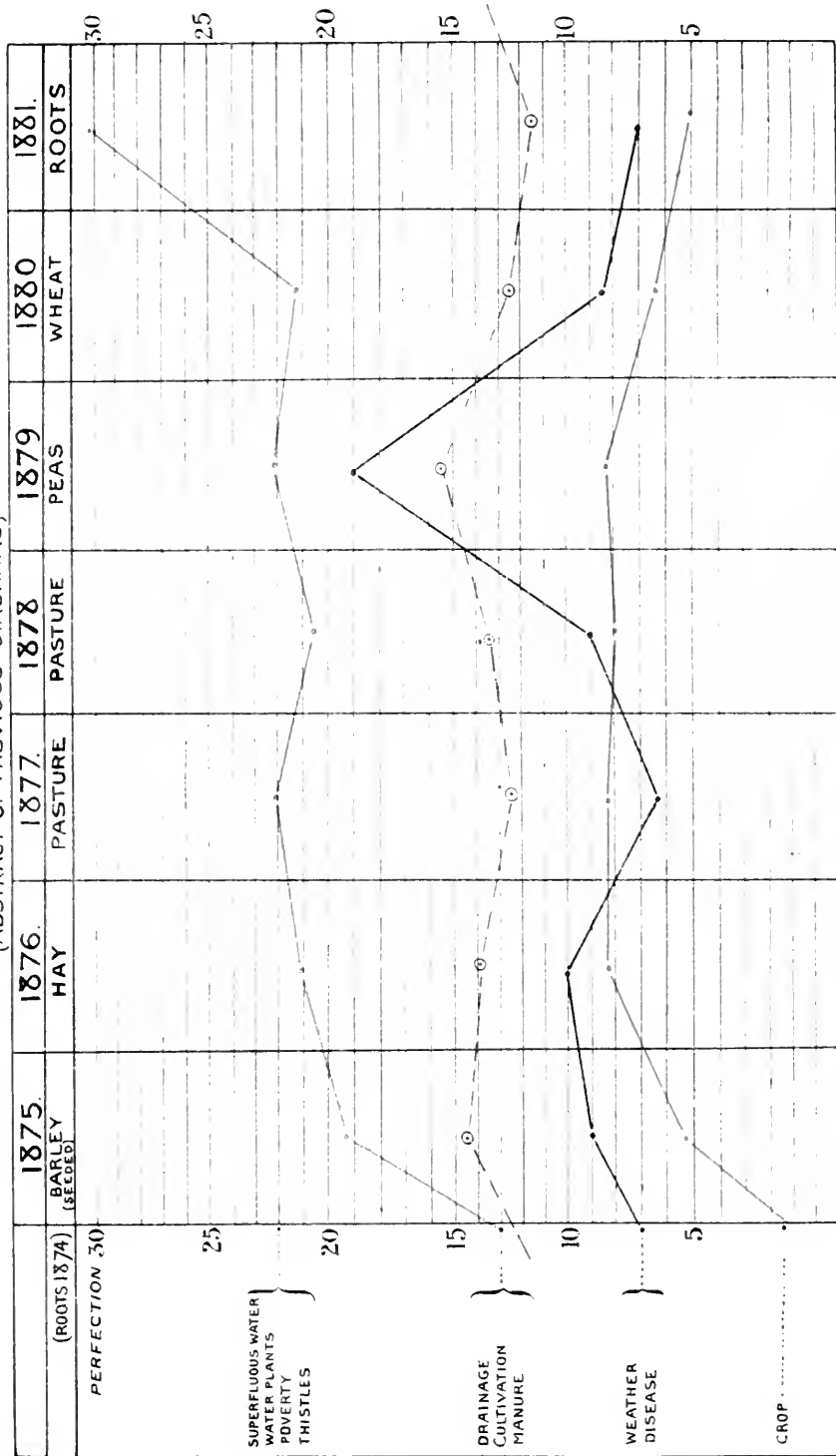
Looking at the whole record for the six months, it is plain that had the $8\frac{1}{2}$ inches—half only of our usual quantity—of rain been evenly distributed over the 49 days on which it fell, and those days regularly placed over the whole, the cropping results would have been very much more favourable; so it is the irregular distribution and not the total quantity so much that affects vegetation.

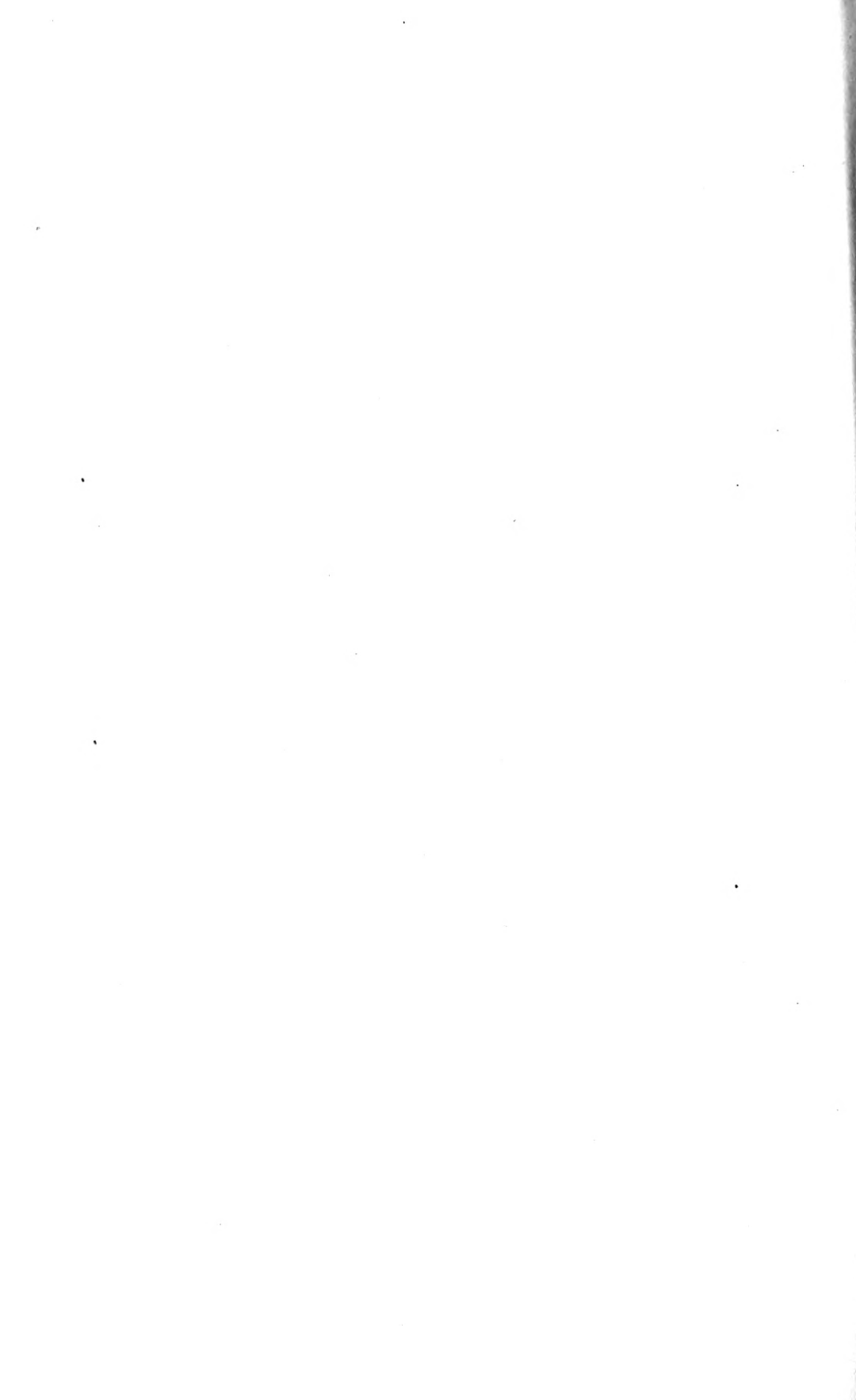
Observe the abstract of weather as follows:

WEATHER—SEASON OF GROWTH AND MATURING, 1881.

MONTH.	RAINFALL.		TEMPERATURE.		
	Days.	Quantity.	Highest.	Lowest.	Monthly Mean.
		Inches.			
April	2	.03	$79^{\circ}8$	$14^{\circ}5$	$39^{\circ}8$
May	13	1.36	$81^{\circ}6$	31°	$56^{\circ}4$
June	12	2.85	$81^{\circ}5$	$37^{\circ}4$	$58^{\circ}4$
July.....	8	1.01	$91^{\circ}5$	$52^{\circ}4$	$67^{\circ}5$
August...	5	2.15	97°	49°	$72^{\circ}7$
September.....	9	1.07	98°	45°	$68^{\circ}4$
	49	8.47			$60^{\circ}5$

FERTILITY BY DRAINAGE, CULTIVATION, MANURE, AND ROTATION OF CROPS.
(ABSTRACT OF PREVIOUS DIAGRAMS)





CHARACTERISTICS OF MONTHS :

April.—Very high temperature ; small rainfall.

May.—Mean temperature above an average, and very high during fourth week.

June.—Rainfall below an average ; high winds.

July.—Great heat during first week ; rainfall much below an average.

August.—Temperature very high during fourth week ; sultry weather.

September.—Warmest on record ; little rainfall.

In fall wheat (Clawson) we had the high average of 38 bushels per acre on an unsheltered field of doubtful previous richness, that had had a crop of oats, but which got an average application of farm-yard manure in fall of 1880. Spring wheat (principally White Russian) was below our average both in quantity and quality, only $17\frac{1}{2}$ bushels per acre from soil in good heart. Barley was under the mean, producing 33 bushels from good, sharp land, previously well done to. Oats fully 45 bushels per acre.

Considering the season, hay stood fairly well with us—or $1\frac{1}{4}$ ton per acre. We had a great bulk of straw from the variety of peas called Prince Albert, and the very moderate quantity of 23 bushels grain ; the average length of straw was six feet, with corresponding strength.

Our highest yield of turnips was 400 bushels per acre, and as low as 170 bushels on different fields. Mangolds were *over* our average upon comparatively new and deep soil in No. 15 field—1,006 bushels per acre by accurate weighings. Potatoes gave 190 bushels, and are good in quality, with few smalls.

For cropping abstract of each field take following table :

ABSTRACT OF CROPPING RESULTS, 1881.

Field.	Area.	Extent of each crop.	NATURE OF CROP.	Quantity. T., Tons. B., Bushels.	Rates per acre.	REMARKS.
1	20½	{ 10½	Hay	10½ T.	1 T.	Gravelly hillocks and thistles.
2	22	{ 10	Pasture			Summer Fallow after Hay in 1880; Experimental cereals.
3	22	{ 22	Oats, Barley, etc.			See Experimental Report.
4	9	{ 9	Barley, seeded	29 T.	1½ T.	Half gravelly hillocks.
5	9	{ 9	Bare Summer Fallow	207 B.	23 B.	Ploughed in parts; drought harmed Timothy and Clover.
6			"			"
7	20½	{ 12	Spring Wheat	18 B.	216 B.	"
8	20½	{ 8½	Oats	320 B.	40 B.	Part high lying and sheltered.
9	21½	{ 20½	Turnips	7700 B.	380 B.	Very much harmed by five weeks' drought.
10	14	{ 21½	Hay	32 T.	1½ T.	Very fine patch of Grasses and Clovers.
11	21½	{ 14	Peas	322 B.	23 B.	New orchard on balance of 10½ acres.
12	21½	{ 21½	Pasture			Uncultivated pasture.
13	23	{ 23	Pasture			Three acres uncultivated.
14	23	{ 23	Hay	34 T.	1½ T.	Three acres in swampy land.
15	21½	{ 10	Manicolds	10060 B.	1006 B.	Few smalls.
	21½	{ 7	Potatoes	1330 B.	190 B.	
	21½	{ 1½	Carrots	510 B.	170 B.	
	21½	{ 3	Turnips			
	21½	{ 4	Corn and Hungarian Grass			
	21½	{ 6	Oats	150 B.	25 B.	Corn a failure; afterwards Hungarian Grass.
16	22½	{ 2	Tares and Oats, fodder			Very poor; No. 16 is a wet, dirty field.
	22½	{ 10½	Pasture			Very fair crop.
17	20	{ 20	Spring Wheat, seeded down	17 B.	340 B.	
18	19	{ 19	Peas	418 B.	22 B.	Fall Wheat sown.
19	30	{ 8	Fall Wheat	304 B.	38 B.	Clawson variety.
20		{ 22	Oats	770 B.	35 B.	Uncultivated.
21	16½	{ 16½	Pasture			
	323½	{ 323½	under actual farm cropping this year.			

3.—RECLAMATION AND IMPROVEMENT OF LAND.

It is the impression of many that we cultivate 400 acres, out of 550, of as clean, naturally dry, stone-free, stumpless and well-fenced land, as need be desired. This is not the case. Two views prevail in regard to what should constitute a Model Farm during its initiation, or say its first decade. One is, that every requisite improvement, of whatever nature, should be executed at once, in order that the country and students may have the records and handling of an immediate first-class thing. I do not agree with this view. I take the side that all permanent improvements should be gradually overtaken—scattered over a series of years: 1st, for the educational value to at least two-thirds of the students; 2nd, for their direct experimental connection; and 3rd, because of legislative economy and better performed work—the crowding of extensive improvements being generally insufficiently done.

What we have done up to 1880 may be gathered from the reports of each year. We have done very much more comparatively during 1880-81 than any two years previous. Field No. 2 has been ploughed four times to check thistles. No. 4 was drained to a considerable extent, loose stones and blasted stones removed, and an old snake fence, with its years of accumulated dirt, thoroughly cleaned. No. 5 was bare fallowed by four ploughings, fast stones blasted and removed. No. 6 has been cleaned of stones and stumps, and ploughed four times as a bare fallow. Field 14 has long been in possession of a low-lying three-acre swale, which this year we have dried with an expensive drain that has its outlet eighteen hundred feet distant, and which has also been cleaned up, burned and ploughed over. Field 13 was much of a swamp seven years ago; part of field 14 four years since; and we have just completed the reclamation of 15 from water, stumps and stones. Our new farm foreman, Mr. Woods, has shown an energy and ability in all this work superior to any of our previous experience. Nos. 16 and 17 fields this year, also, have been blasted of fast stones.

In addition to these improvements during 1881, we have overtaken the grading of part of road round farm buildings and of centre lane; the drainage of part of Nos. 16 and 18, and the fencing of south lane across fields 2 and 3 with board; the fencing of lane across the east half of field 17 with iron, sunk in stone; and the fencing of lane along No. 16, bush with wood and wire.

III.—THE LIVE STOCK.

I should like to preface this year's notes on this engrossing branch of our profession with some remarks on the rearing of store cattle by grazing in our own Dominion.

Ontario is not a grazing country. It has no extensive natural or artificial runs for cattle or sheep, where even growth of frame can be systematically relied upon in preparation for stall feeding; there are neither prairies nor uplands, nor valleys nor hill ranges, where nature welcomes to a feast of fat things from May to October. The Province is too rich all over for the ranch patriarch or the strolling shepherd. We are grain growers, and therefore beef growers in this connection.

But it must not be said that Ontario cannot graze her own cattle and sheep—it could be done were we willing to do it. Not yet exactly do we feel the want of it, or rather the value of it, being able to build all our own bone and muscle, along with some flesh and fat, ere topping off during six months of winter and spring for the butcher at home or abroad. It is a pity we are not feeling this grazing want more keenly; most of us are contented with turning out the yearling to the bush, and the hay after-growth, and the Timothy pasture, where, no doubt, progress is often very good—wonderfully good indeed, but there is no *annual and monthly reliability*—no undeviating round of a variety of plants to meet all the wants of animals that should be rushed for the market. While our remarks apply more to beef and mutton, they are not foreign to production of milk. Such, nowadays, in every country bearing up to the times, is the value of a rich piece of meadow on every farm, that were every farm in Ontario in possession of a *properly managed five-acre permanent pasture plot*, the gain to the whole country would exceed \$5,000,000 annually. If I cannot overtake in this report a special chapter on the estab-

lishment and management of permanent pasture, as applicable to Ontario, I trust to be able to do so on another occasion.

Many of our finished students and others having in view to test the entirely new line of cattle grazing on our north-western territories, have asked my views on the whole question of probable expense and outcome thereof on a moderate-sized run in a good locality. Let us do so now.

One batch of thoughts is :—

1. Government terms of occupancy or proprietorship.
2. Value of pasturage, annual reliability, feeding properties, winter keep.
3. Kind of cattle most likely to succeed.
4. Extent of investment that would pay.

The second batch would be :—

1. Capital necessary.
2. Annual expenses.
3. Annual revenue.

The Government terms are most liberal, and substantially thus : Lease of twenty-one years ; renewal two years previous to termination ; area not to exceed 100,000 acres for one concern ; rental one cent per acre ; must graze one cattle beast to every ten acres, and the allowance of five acres to every hundred on a cattle station in one block as personal property, on payment of \$1.25 per acre.

Now, my first conception of the make-up of such an enterprise is *association*—that is, more than one in its practical management on the spot, because of its comparative speculative character, of its hardships in a measure, and of the immense value of personal supervision. I would recommend the agreement of three young practical stockmen in possession of say \$5,000 each, making a joint purse of \$15,000. Having chosen, by actual inspection, the district in view of future railway communication ; the particular 2,000 acres, with its shelter, water supply and rich enduring grasses ; the ultimate necessity of fencing cheaply by utilizing any natural advantages, such as rivers ; the very model of a choice of 100 acres as a cattle station, and the easy extension of the ranch, should everything smile—the choice of a breeding stock follows.

The sole aim of men under such circumstances would certainly be to raise the largest number of the best store-beefing cattle in the shortest time, and place an annual draft of them on a railway, or at seaboard, at the least possible cost.

Which breed or breeds, crosses or grades of cattle will do these on the south-western part of our north-western territories, adjacent to the Rocky Mountains ?

The choice of cows and heifers must necessarily be confined to what can be had in the United States and Canada, from among those grades or native stock that by their whole stamp, as regards roominess, size, form and disposition, would prove the best possible *grazier* by the use of some kind of thoroughbred bull. The character of such a cow should be otherwise : a good ranger—that is, active in searching for the best patches of grass ; a good nurse, able to defend herself and charge, not a wanderer ; a home comer when required ; hardy as regards changes of climate, and keeping up well on indifferent pasture, if necessary.

Such are plentiful all over the continent at prices ranging from \$30 to \$50 per head. Then there is also the great field of Texan and Montana cows, the better samples of which are, in several respects, superior to the one just sketched, and wants mainly in a roomy, square frame and quieter disposition, at prices from \$10 to \$20 a head. Indeed it will be a question to solve, whether or no, by the use of the proper bull, the best Texan cows will not secure the most profitable results on an average of things over a lengthened period, as against the more foreign element unaccustomed to prairie conditions. This latter view, however, can but have a short history, because their progeny would gradually acquire the whole grazing status necessary for the district. I think it would be well to possess, in addition to the common breeders, a small number of pure-

bred cows similar to the bull or bulls in use, wherewith to maintain a succession of bulls and cows, and thus lessen expense of having to renew from a distance.

No difficulty exists, therefore, in knowing what kind of cows to use ; the trouble, if any, lies in telling exactly what breed of bulls will clearly give us what we want from such cows and their offspring. There is really no experience to build upon, and all that can be advanced in these first steps of the raising of store-beefing cattle in our North-west, is to experiment with what we know can make the best average of all the requirements in other parts of the world. Take a systematic view of the requirements, and what we know can be done by the leading beefing breeds from common stock.

	Maximum Value of Points.	Shorthorn.	Hereford.	Galloway.	Aberdeen Poll.
Reliable breeders.....	5	4	5	5	4
Impressive power	10	10	9	8	8
Giving early maturity	15	15	12	8	15
Giving weight.....	15	15	10	9	13
Grazing disposition.....	20	15	20	18	17
Hardiness.....	15	10	13	15	13
Quality of flesh.....	5	2	3	5	4
Least offal	10	9	10	10	9
Permanency of character.....	5	3	5	4	4
	100	83	87	82	87

It is only by such a tabular view as this that strict comparisons can be arranged and criticized—"book-wise" as it may appear to some of our stiffer-necked old school judges. It is not enough nowadays to say, "I know this is the best ;" we must give reasons for every step and action of our progress. So then, casting the memory over the world's beefing lords, it is concluded to confine the choice to four kinds.

But more specifically. I bow to no one in admiration of the splendid Shorthorn, the greatest beefing and milking cattle of the world—still their's to make as much history as ever—a breed that never can be anything but grand ; yet, when I am calculating, as I now am, to experiment or speculate in a largely unknown land, where conditions of *civilized* animal life are entirely unknown, I must hesitate in making them one of my agents in the enterprise ; and why ? Not because of their want of impressive power, nor of their early maturity, nor weight, but simply because we can have other breeds wherewith we know we have more chances of success in reliable breeding, and more given to do well on risk of poor fare. If new things ever become old in the new land, the world's beeper will easily find his place. Meantime, what does the Galloway say ? No want of hardiness, nor kindly grazing, nor reliability in breeding, nor first-class quality of flesh, but clearly very short in weight and early maturity when close comparisons are entered upon ; and thus, for the best average of all our wants under the estimated conditions, the Galloway has to step aside. The other poll is not a Galloway, nor ever had anything to do with Galloways. In all their history the Angus or Aberdeen poll stand clearly on their own merits as a distinct breed ; they are essentially the *Shorthorn* of the north of Scotland, and by the comparative table we find them ahead of the English Shorthorn in hardiness, in quality of flesh, in adapting themselves to grazing conditions, but not equal in impressive power—according to comparatively limited experience, no doubt—equal, however, in early maturing properties, yet deficient, on an average, in weight per head.

Because of their white face, the Herefords are often designated "these consumptive-looking things," by some of their non-admirers; but placed side by side with their rivals, we find that, while back somewhat in early maturing, and considerably so in weight, this breed, that has "breadth and depth without height," is after all second to none in view of the *probabilities* of our North-west grazings; they are so strong in impressive power, in hardiness, and especially in making flesh upon grass, that I am clearly of opinion we should ask them to lead in this great experiment. On the supposition that we can catch every possible virtue and want by the nine points—reliable breeders, impressive power, early maturity, weight, grazing disposition, hardiness, quality of flesh, least offal, and permanency of character—and that the value or importance of these are *relatively and properly valued* at a maximum of 5, 10, 15, 15, 20, 10, 15, 5 and 5 respectively, it will be interesting to any one to analyze the table thus submitted. Practically there is little difference on the *great average of things* between these four breeds, and the difference that does exist may be accounted for by difference of opinion between men. If asked, however, to make a selection from the four, I would not hesitate, *under the circumstances*, to take them in the order of merit as shown, namely: Hereford, Aberdeen poll, Shorthorn and Galloway.

The next consideration is the capital required for the first two years, during which time, it is presumed, all settling down, house building, fencing of cattle station, enclosing corrals, in addition to the necessary number and variety of live stock, household maintenance, and some implements for ordinary cultivation. After this two-year period some revenue should be accruing, though necessarily not so much as the annual average to be afterwards expected, because, in place of selling all heifers along with the steers, the greater number would be retained to increase the breeding stock. First the estimate, and afterwards any comments upon it:—

Personal expenses of one examining ground and securing lease, etc.	\$400
Price of four yearling bulls delivered at ranch, at \$400 each	1,600
Price of three thorough-bred heifers	900
" 250 cows and heifers (mixture of grades, Texan and Montana), at \$25 each	6,250
Price of two yoke oxen	300
Twelve saddle horses, natives	600
Total for live stock	\$10,050
Cost of dwelling-house, stables and sheds	600
Fencing 100 acres as cattle station, the home property	500
Enclosing two corrals	150
Agricultural implements, tools, etc.	1,000
Unenumerated	300
Total for building, fencing, etc.	2,550
Household maintenance and personal expenses of three Principals during two years	750
Wages and keep of two lads during two years	2,000
Incidental expenses	250
Rent	40
	3,040
	\$15,640
Price of 100 acres of homestead, at \$1.25	125
Total capital required	\$15,765

It will be obvious at the first glance of this estimate that we are not dreaming of delegating the investment and management of our money to others, as is usually the case in a much larger concern, or where the heavy purse is a party. Our aim is to show that

it does not require a millionaire to start and handle a cattle ranch, but that three practical heads with \$5,000 each may safely do so. By putting a high cost upon everything, securing four first-class bulls and three heifers, with 250 common cows and heifers, two yoke of oxen, twelve native horses for the saddle, with high figures also for the erection of buildings and fences of the usual rough but comfortable kind, the purchase of implements such as ploughs, mowers and waggons, in addition to the personal maintenance of themselves and two young men, the three principals would be in possession of a fully equipped ranch of 2,000 acres at the end of two years.

In saying 2,000 acres, it will be evident that we are calculating circumspectly, *pro tem.*, whatever the future may bring about. Until grazing locations become as regular as Ontario farms are to each other, our 2,000 acres may be 20,000, so long as neighbours don't push or *outfeed* us in number of stock. Necessarily this implies more trouble and expense in superintendence, collecting, numbering and branding, but then it also means very much more revenue. A question of some importance presents itself at this stage of our inquiry—how are we to brand *hornless cattle*? The hot iron cannot be used anywhere with them except upon the hoof, and this would always be a very awkward check—in fact, is rarely used: branding on the skin is only of one year's use, and any other form of hair marking soon grows out, and ear labelling would not do, unless everybody was above suspicion. It is evident that a plan of *ear-marking* or *hole-punching* is wanted, and in order to draw forth something better, I beg to suggest the following:—

The two ears have four distinct sides—two upper and two lower—thus giving four unmistakable base lines, that the commonest cow-herd could not misinterpret: (1) the upper of the right ear; (2) the upper of the left ear; (3) the lower of the right; and (4) the lower of the left—thus:



The average length of an ear being eight inches, and about four inches in breadth, there is space enough for three distinct positions on each base—one near the point, another in the centre, and the third near the head; these, on our four edges, sides or bases, give twelve positions.

The idea now is to arrange such a plan of punch-holes at these twelve places as will represent all the letters of the alphabet excepting I and Z,—therefore twenty-four. My plan is as follows:—



A double punch constructed to cut out a wedge piece, and also a circular hole, will serve the purpose; and now supposing it is desired to mark cattle belonging to William Brown, Guelph, the cuts would take this position:—



W. B., G.—WILLIAM BROWN, GUELPH.

But, of course, the G. could be omitted if considered confusing, and to meet the case of *similar initials* with a different name, such as Walter Butler, the last letter of both Christian and surname can be added thus, the cuts being doubled as required:—



WR. BR., G.—WALTER BUTLER, GODERICH.

And so on, in almost any variety. Were some such plan as this registered as the Government standard or index, much trouble would be saved, as it could not possibly be left to individuals to record their own ear-marks, because no possible variety could meet the wants of hundreds of different graziers.

But the most important and difficult part of this grazing question has now to be handled—the estimate of annual revenue after the first two years. In doing this we will assume the non-necessity of much winter keep to breeding stock, all required being an occasional bite of hay at more severe times, the absence of any sweeping epidemic or extensive stealing, but allowing for ordinary proportion of deaths.

Entering upon possession in spring of 1881, the 250 breeding cows and heifers, less deaths and non-breeding, will have dropped 550 calves by August, 1883, one-half of which will be two and a-half years old, and the other half, being yearlings and calves, to be retained for another season's culling. Of these 275 head, 25 heifers would be kept for filling up blanks among breeders, the 250 to be sold. In taking stock, therefore, on 1st September, 1883, there should be about—

250 breeding cows and heifers.

275 yearling steers and heifers and calves.

250 two-year-olds for sale.

—
775 head in all.

ESTIMATE OF INCREASED VALUE.

First draft of two-year-old steers and heifers, delivered at railway (average weight 950 pounds), 250 head at \$23 ..	\$5,750
Value of 275 yearlings and calves, retained, at \$12	3,300
Value of seven additional thorough-bred bulls and heifers	1,500
	<hr/>
Gross increase from live stock	\$10,550
Depreciation in value of older breeding cows, none over five years old	\$400
Depreciation in value of horses, oxen, implements, etc. .	300
Miscellaneous debits	300
	<hr/>
	1,000
	<hr/>
Net increase during two and a-half years. .	\$9,550

It is not necessary to charge or discharge anything more than what has been done in connection with the cultivation of perhaps fifty acres of grain, roots and household stuffs, and ample allowances have been made for "unforeseen and unprovided," so that this net balance of \$9,550 gives \$3,820 as annual clear revenue from the investment of \$15,000.

Finally, I shall suppose that I am *one-fifth* wrong in calculating capital account *too low*, and *one-fifth* wrong in estimating revenue *too high*, which I simply grant for the sake of quashing all argument. By this concession we still have an annual clear revenue of \$3,050 from an investment of \$18,000, or a return of *17 per cent. per annum*.

From what other agricultural subject can such a return be made year after year? We but need some facts to confirm these estimates, and I think it would be well that the Dominion Government at once employ a practical expert, one clear of all influences whatsoever, to thoroughly examine, during winter and summer, the best sections of our great North-West grazing lands, in order to the issue of a report showing the question in all its possible bearings. The value of such a document would be immense.

2. THE WASHING OF WOOL.

There are two opinions on the question of profit to the farmer in washing sheep before shearing. All quotations of prices are by the pound of sixteen ounces, *washed*, and when the farmer takes his wool to the market unwashed he receives *one-third* less. Example: in place of thirty he receives twenty cents, because, as the purchaser says, there is fully a difference of one-third in weight.

We have inquired into this, and have ourselves tested the point of difference in weight between washed and unwashed wool. There is, for all practical purposes, just one-third difference, with a slight tendency in favour of unwashed—that is, as the sheep, after washing, are allowed to dry and re-yolk for about two weeks, the fleeces gather dirt, and are not, properly speaking, clean of all sand and soil, so that the real result on the market is in favour of the seller and against the buyer.

In illustration of the farmer's position, take our current year's sales of wool—all unwashed, of course:—

Long wool—Leicester, Cotswold and Canadian, 1,117 lbs., at 15 cents per lb.	\$167.55
Medium—Oxford Down, 130 lbs., at 18 cents per lb.	23.40
Short—Southdown, Southdown grade and Shropshire Down, 242 lbs., at 21 cents per lb.	50.82
	<hr/>
Total unwashed price	\$241.77

Had this wool been washed it would have weighed only 745, 97 and 162 lbs. respectively, and realized as follows :—

Long	745 lbs., at 23 cents per lb.....	\$171.35
Medium	97 " 27 "	26.19
Short	162 " 32 "	51.84

Total washed price \$249.38

What does the manufacturer say to this? Where is the farmer's profit in washing wool? Where anything to meet his time and expenses, in addition to risk of a death or two among a large number in a river or pond? There can be no desire to discourage the washing of sheep before clipping, but the advantage to the farmer must be evident. If the manufacturer says he won't buy unwashed at any price, then matters would be changed; but so long as the present one-third difference holds, the farmer has clearly the advantage in not washing.

3. PUBLIC SALE OF LIVE STOCK, 1881.

This, our fifth annual disposal of surplus animals, was marked by several unusual circumstances. The draft of young cattle, sheep and swine was fully over the average in merit, but possibly with fewer examples of individual excellence. Two Shorthorn heifers, neither plain nor grand, brought \$90 apiece,—*only*, as some would add,—yet, after all, not such a small one for the average farmer, nor for the breeder as such. A two-year-old Aberdeen Poll heifer fetched \$306, and two bulls of the same kind averaged \$125. We were privately offered *thirty-five per cent.* more for these. Ayrshires made an average of \$65 and Devons of \$50 each. The demand for Herefords and Aberdeen Polls has been very keen, \$150 to \$200 being freely given for bull and heifer calves of either breed; there is no abatement in the extensive demand for Shorthorn yearling bulls. Our own feeders of live stock are rousing up to the want of *blood* for their purpose; and while quietly grudging anything over \$150 a head, they believe, nevertheless, in giving more when the pedigree is on the animal's back as well as on paper.

It forms a very instructive study to mark the average prices realized for different breeds of sheep, as evidence, other things being equal, of the turn in the wool and mutton markets.

AVERAGE PRICES REALIZED FOR SHEEP.

Aged Cotswold ram	\$51 each.
Shearling Cotswold rams	31 "
Cotswold ram lambs	18 "
" ewe lambs	15 "
" ewes	15 "
Leicester shearling rams	48 "
" ram lambs	22 "
" ewe lambs	12 "
Aged Oxford Down ram	56 "
Oxford Down shearling rams	52 "
" ram lambs	30 "
Shropshire Down ram lambs	45 "
Aged Southdown rams	80 "
Southdown shearling rams	40 "
" ram lambs	15 "
" ewe lambs	12 "
" ewes	20 "

General mean :—

Oxford Downs	\$46 "
Shropshire Downs	45 "
Southdowns	33 "
Cotswolds	26 "
Leicesters	24 "

PUBLIC SALE OF SURPLUS LIVE STOCK, 8TH SEPTEMBER, 1881.

LOT.	CLASS.	PURCHASER.	AMOUNT.	TOTAL.
CATTLE.			\$ c.	\$ c.
SHORTHORNS—				
1	Heifer calf	R. Hermiston, Mount Forest	102 00	
2	“ “	J. Carter, Guelph	75 00	
3	Bull	A. McGibbon, Milton	122 00	299 00
HEREFORD—				
4	Bull	O. Duck, Hannibal, Mo., U.S.	175 00	175 00
ABERDEEN POLLS—				
5	Bull calf	M. Boyd, Bobcaygeon	116 00	
6	Bull	G. Hood, Guelph	134 00	
6 (A)	Eyebright III.	M. Boyd, Bobcaygeon	306 00	556 00
AYRSHIRES—				
9	Bull	E. Keeler, Maitland	70 00	
10	Bull calf	S. Brown, Fordwich, Huron	60 00	130 00
DEVONS—				
7	Princess Mary	E. A. Barnard, D.A., Quebec	58 00	
8	Heifer calf	“ “ “ “	37 00	95 00
SHEEP.				
COTSWOLDS—				
1	Ram “Duke”	J. C. Snell, Edmonton	51 00	
2	Two shear ram	E. A. Barnard, D.A., Quebec	35 00	
3	Shearling “	“ “ “ “	31 00	
4	“ “	P. McGregor, Mimosa	31 00	
5	“ “	J. Giffen, Edmonton	20 00	
6	“ “	E. A. Barnard, D.A., Quebec	34 00	
7	“ “	H. Ferguson, Avon Bank	35 00	
8	Ram lamb	E. A. Barnard, D.A., Quebec	13 00	
9	“ “	D. T. Wilson, Teeswater	25 00	
10	“ “	J. C. Snell, Edmonton	23 00	
11	“ “	J. F. Davis, Glauworth	13 00	
12	“ “	E. A. Barnard, D.A., Quebec	12 00	
13	“ “	J. Lowden, Montreal	30 00	
14	“ “	J. C. Snell, Edmonton	23 00	
15	“ “	“ “	16 00	
16	“ “	“ “	15 00	
17	“ “	J. Anderson, Arthur	17 00	
18	“ “	R. Worth, Petherton	17 00	
19	“ “	W. H. Stubbs, Bosworth	14 00	
20	“ “	W. Early, Norval	17 00	
21	“ “	O. Duck, Hannibal, Mo., U.S.	10 00	
22	One pair ewes	W. J. Rudd, Arkell	24 00	
23	“ “	E. A. Barnard, D.A., Quebec	24 00	
24	“ “	“ “ “ “	30 00	
25	“ “	“ “ “ “	26 00	
26	“ “	“ “ “ “	34 00	
27	“ “	“ “ “ “	42 00	
28	“ “	W. J. Rudd, Arkell	28 00	
29	One pair ewe lambs	O. Duck, Hannibal, Mo., U.S.	20 00	
30	“ “	T. McCrae, Guelph	28 00	
31	“ “	O. Duck, Hannibal, Mo., U.S.	22 00	
33	“ “	J. C. Snell, Edmonton	24 00	
34	“ “	B. Watson, “	32 00	
35	“ “	O. Duck, Hannibal, Mo., U.S.	24 00	
36	“ “	E. Jeffs, Bond Head	26 00	
37	“ “	J. C. Snell, Edmonton	26 00	
38	“ “	E. A. Barnard, D.A., Quebec	40 00	
39	“ “	J. C. Snell, Edmonton	30 00	962 00

Carried forward

2,217 00

PUBLIC SALE OF SURPLUS LIVE STOCK—*Continued.*

Lot.	CLASS.	PURCHASER.	AMOUNT.	TOTAL.
	SHEEP— <i>Con.</i>		\$ c.	\$ c.
	LEICESTERS—	<i>Brought forward</i>		2,217
40	Shearling ram	F. Wyatt, St. Catharines	48 00	
41	Ram lamb	J. O. Stewart, Millburn	41 00	
42	" "	J. Knight, Kingston	19 00	
44	" "	T. Bostock, Wyoming	22 00	
45	" "	F. Wyatt, St. Catharines	14 00	
46	" "	J. Drummond, Clifford	15 00	
47	One pair ewe lambs	H. Glazebrooke, Simcoe	28 00	
48	" "	"	20 00	207 00
	OXFORD DOWNS—			
49	Three shear ram	J. Prain, Harriston	56 00	
50	Shearling ram	J. Little, Blair	52 00	
51	Ram lamb	J. Anderson, Arthur	33 00	
52	" "	J. P. Woods, Guelph	28 00	169 00
	SHROPSHIRE DOWNS—			
53	Ram lamb	H. Watson, Guelph	29 00	
54	" "	E. E. Patterson, Eastwood	60 00	89 00
	SOUTHDOWNS—			
55	Ram	H. Sorby, Guelph	80 00	
56	Shearling ram	E. A. Cross, River Beaudette	36 00	
57	" "	M. A. Dawes, Montreal	45 00	
59	Ram lamb	O. Duck, Hannibal, Mo., U.S.	9 00	
60	" "	J. F. Davis, Glanworth	18 00	
61	" "	H. Sorby, Guelph	20 00	
62	" "	J. Anderson, Arthur	21 00	
63	" "	O. Duck, Hannibal, Mo., U.S.	16 00	
64	" "	P. J. Wilkinson, Cambray	8 00	
65	One pair ewe lambs	O. Duck, Hannibal, Mo., U.S.	20 00	
66	" "	A. Nichol, Kingston	18 00	
67	" "	D. Wright, Chesterfield	20 00	
68	" "	L. N. Smith, Ashburn	28 00	
69	" "	R. Rivers, Walkerton	36 00	
70	One pair ewes	A. A. Sanders, Guelph	28 00	
71	" "	L. N. Smith, Ashburn	54 00	
72	" "	W. Mills, Wingham	36 00	
73	One pair shearling ewes	E. J. Yorke, Wardsville	40 00	533 00
	PIGS.			
	BERKSHIRES—			
1	Boar	W. Hull, Erin	27 00	
2	"	"	27 00	
3	"	R. Rivers, Walkerton	21 00	
4	"	W. Lachnar, Hawkesville	22 00	
5	Sow	M. Boyd, Bobcaygeon	27 00	
6	"	"	40 00	164 00
		Gross total		\$3379 00

4. INCREASE TO LIVE STOCK BY OWN BREEDING.

From 1st November, 1880, to 1st November, 1881, we have, by our own breeding, received the following thorough-bred cattle and sheep:—

Cattle.

- 27th Dec., 1880.—*Princess Mary 4th*, Hereford, out of *Princess Mary 2nd*, by *Duke of Connaught* (4528).
- 22nd Feb., 1881.—*Sir Walter 3rd*, Ayrshire, out of *Beauty of Drumlanrig*, by *Sir Walter*.
- 23rd Feb., “ —*Louan of Galt*, Shorthorn, out of *Louan of Brant 5th*, by *Prince Hopewell*.
- 29th April, “ —*Princess Mary 3rd*, Devon, out of *Nellie*, by *Prince Albert Victor*.
- 8th May, “ —*Lord Macduff*, Aberdeen Poll, out of *Leochiel Lass 4th*, by *Gladiolus* (1161).
- 10th June, “ —*Heather Bell 3rd*, Hereford, out of *Heather Bell*, by *Duke of Connaught* (4528).
- 31st July, “ —*Sir Walter 3rd*, Ayrshire, out of *Flora 3rd of Drumlanrig*, by *Sir Walter*.
- 19th Aug., “ —*Princess Louise 2nd*, Hereford, out of *Princess Louise*, by *Quebec*.
- 28th Oct., “ —*Prince Hopewell 2nd*, Shorthorn, out of *Rosalie*, by *Prince Hopewell*.

Sheep.

Cotswolds	Ram lambs	21	} from 44 ewes.
	Ewe	37	
Leicesters	Ram	9	} “ 14 “
	Ewe	7	
Oxford Downs	Ram	3	} “ 5 “
	Ewe	3	
Shropshire Downs	Ram	3	} “ 4 “
	Ewe	4	
Southdowns	Ram	8	} “ 19 “
	Ewe	13	

In addition to pigs, grade lambs, grade cattle of many varieties, and Scotch Collie dogs.

5. OUR NEW IMPORTATIONS OF LIVE STOCK.

We were allowed by the Estimates the sum of \$6,250 wherewith to renew some of our breeds of cattle and sheep, as advised by yourself and reported upon by me. Advantage was taken of the agency of Mr. James Hunter, of Alima, Ontario, who had arranged to proceed to Britain to obtain stock for himself and others. After Mr. Hunter's return we secured other animals of recent importation, and one Canadian bred. Through these sources we are now in possession of eight new cattle of six breeds, and nineteen sheep of five breeds.

I beg to submit a full list of these animals, with their original cost, and all attendant charges until delivery here.

As it will be of special value to us in view of revenue, and should be of general interest to the Province, the pedigree of each of the newly-imported male animals is herewith appended:

IMPORTATION OF CATTLE AND SHEEP FROM BRITAIN FOR THE ONTARIO
EXPERIMENTAL FARM DURING 1881.

I.—First cost of animals—

Shorthorn bull "Sir Leonard"	\$765 50	
" heifer "Beta"	1,275 80	
Aberdeen Poll bull "Meldrum"	256 30	
" " heifer "Sybil's Darling"	243 00	
Hereford bull "Hope Dale"	204 12	
Ayrshire bull "Stonecalsey"	267 30	
Jersey heifer "Princess Alexandra" ..	300 00	
Devon bull "General Wyndham"	125 00	
Total for cattle		\$3,437 02
Leicester ram and two ewes	194 40	
Cotswolds, two rams	252 06	
Oxford Down ram and four ewes	233 28	
Shropshire Down ram and three ewes ..	243 00	
Southdown ram and four ewes	250 00	
Total for sheep		1,172 74

II.—British railway charges	148 70	
III.—Ship freight	195 00	
IV.—Food previous to quarantine	344 65	
V.—Quarantine	121 42	
VI.—Quebec to Guelph	171 10	
VII.—Insurance	191 50	
VIII.—Incidental delay at Liverpool, tools, etc....	64 05	
IX.—Allowance to agent for making purchases ..	400 00	
		1,636 42
Total discharge	\$6,246 18	
Sum under-expended	3 82	
		\$6,250 00

PEDIGREES OF NEW BULLS AND RAMS.

SHORTHORN BULL, "*Sir Leonard*," roan; calved 4th January, 1880. Got by "*Sir Wilfred*" (37484), bred by J. C. Booth.

Dam, "Countess 3rd," ..	Got by "High Sheriff" (26392), bred by T. C. Booth.
" "Countess 2nd," ..	" "British Crown" (21322), bred by R. Booth.
" "Countess"	" "Sir Sam" (25171), bred by J. Peel.
" "Calendula"	" "Majestic" (13279), bred by R. Booth.
" "Calomel"	" "Hamlet" (8126), bred by J. Booth.
" "Chalk"	" "Leonard" (4210), bred by R. Booth.
" "Bellona"	" "Buckingham" (3239), bred by J. Booth.

Dam from the stock of Sir M. W. Ridley, Bart.

"Sir Wilfred" is by "Royal Benedict," for many years the principal sire at Warlaby, from "Lady Fanny, by "Lord Blithe," own brother to the famous Royal prize cow "Lady Fragrant." "High Sheriff," used three seasons at Storrs, was by "Commander-in-Chief" (first prize at the Royal, 1868), from "Blooming Bride," by "Prince of Battersea," first prize bull calf at the Yorkshire Show, 1863.

Weight of "*Sir Leonard*," 1464 lbs.

AYRSHIRE BULL, "*Stoncalsey*," (309), bred by Alexander Paton, Stoncalsey, Symington, Ayrshire.

Got by "Black Jock 2nd" (122). Dam "Rosie," got by "Prince Charlie."

"Stoncalsey" (309) gained the following prizes:—1st at Symington, Ayrshire; 2nd at Maryhill, Glasgow; 1st at Hamilton; 1st at Lanark, and Medal for best bull of any age; 1st at Biggar, and cup for best animal of Ayrshire breed.

Weight of "Stoncalsey," 1326 lbs.

ABERDEEN POLL BULL, "*Meldrum*" (1759), calved 25th April, 1880. Bred by the Marquis of Huntly. Got by Warrior (1291).

Dam, "Madge" (1217)..... Got by "Major of Tillyfour" (509).

" "Ruth of Tillyfour" (1169) " "Black Prince of Tillyfour" (366).

" "Beauty of Tillyfour 2nd" (1180) .. " "Young Jock" (4).

" "Favourite" (2) " "Gray-breasted Jock" (2).

Weight of "Meldrum," 1204 lbs.

DEVON BULL, "*General Wyndham*" (802), calved Bred by G. Rudd. Got by "Hartland" (363). Dam, "Curley 2nd" (577).

Weight of "General Wyndham," 1562 lbs.

HEREFORD BULL, "*Hope Dale*," calved March 26th, 1880. Bred by W. Horton, Eng. Got by "Nero" (5477).

Dam, "Miss Alice 2nd" Got by "Hildebrand" (4646).

" "Miss Alice" " "Sir Roger" (4990).

" "Maximillian (3252).

" "Jersey" (976).

" "Son of Young Ben" (3609).

" "Young Royal" (1469).

Weight of "Hope Dale," 1320 lbs.

OXFORD DOWN RAM, "*Treadwell* 1881." Got by "Prince of the West." Bred by J. Treadwell, of Upper Winchender, Aylesbury, England.

"Prince of the West" was got by "The Snell," which was got by "Freeland," and bred by J. Treadwell.

Weight, 263 lbs.

SHORPSHIRE DOWN RAM, "*Zetland* 1881." Bred by the Earl of Zetland, spring 1880.

Got by "Post Captain." Dam by Mr. Nock's prize ram; granddam by Mr.

Lythell's prize ram; great granddam descended from the Pitchford Flock.

"Post Captain" was bred by Mr. John Evans; sire, "British Tar," dam by "Union Jack," granddam by "Nonpareil"—Mr. Nocks' prize ram. Sire, a ram of Lord Chesham's, hired at 110 guineas in 1873, and sold for 115 guineas in 1874.

Weight, 195 lbs.

SHORPSHIRE DOWN RAM, "*Nocks* 1880." Bred by Mr. Nocks, England, spring 1879.

Weight 283 lbs.

SOUTHDOWN RAM, "*Colman* 1881." Dropped spring 1880. Bred by Mr. Colman, Norwich, England. Got by Mr. Henry Webb's "No. 6 1879," dam from Captain Taylor's flock.

"Colman 1881" took 1st prize in a class of twelve ram lambs of various breeds at Norfolk in 1880.

Weight, 206 lbs.

COTSWOLD RAM, "*Aylmer* 1881." Bred by H. Alymer, of Norfolk, England.
Weight, 265 lbs.

COTSWOLD RAM, "*Kilkenny Champion*." Bred by Stephen Gillett, Oxon, England.
Weight, 243 lbs.

LEICESTER RAM, "*Bosanquit* 1881." Bred by the Rev. Mr. Bosanquit, Scotland.
Weight, 236 lbs.

MERINO RAM. Imported from France.
Weight, 235 lbs.

6. CARCASS AND WOOL OF WETHER LAMBS PREPARING FOR SHEARLING MUTTON.

We have on hand, experimentally, a score of wether lambs in view for next Easter and Christmas. They are out of common Canadian ewes by our rams of the respective breeds named. The wool and frames of these are an interesting study at the present time, and so, in preparation for next year's finishing, I have pleasure in submitting average weights of each kind, with lists of length of wool, in comparison with the pure breeds of the same age :

AVERAGE WEIGHTS OF GRADE WETHER LAMBS, CHRISTMAS, 1881.

Cotswold Grade	120 lbs.
Leicester Grade	117 "
Oxford Down Grade	131 "
Shropshire Down Grade	125 "
Southdown Grade	116 "
Merino Grade	110 "

LENGTH OF GRADE WETHER LAMBS' WOOL AS AT CHRISTMAS, 1881.













Cotswold Grade	6 inches.
Leicester Grade	6 "
Oxford Down Grade	5 "
Shropshire Down Grade	4 $\frac{1}{2}$ "
Southdown Grade	4 $\frac{1}{2}$ "
Merino Grade	3 $\frac{1}{2}$ "

In comparison with these, note those of the pure breeds from lambs of the same age :—

Cotswold ..	11 inches.
Leicester	7 $\frac{1}{2}$ "
Oxford Down	4 $\frac{1}{2}$ "
Shropshire Down	3 $\frac{1}{4}$ "
Southdown	3 "
Merino	2 "

As much of the manufacturing value of wool lies in the coarseness or fineness of fibre, or diameter of each plant, the following diagram shows this, being the average, as nearly as possible, of that for each of the lambs named. A large magnifying power was used :—

7. COMPARATIVE DIAMETER OF FIBRE OF TWELVE KINDS OF WOOL FROM LAMBS NOW
AT THE ONTARIO EXPERIMENTAL FARM.

PURE		MERINO.
PURE		SOUTHDOWN.
MERINO		GRADE.
PURE		SHROPSHIRE DOWN.
SOUTHDOWN		GRADE.
PURE		OXFORD DOWN.
SHROPSHIRE DOWN		GRADE.
OXFORD DOWN		GRADE.
COTSWOLD		GRADE.
LEICESTER		GRADE.
PURE		LEICESTER.
PURE		COTSWOLD.

IV.—THE EXPERIMENTAL.

I find a few things are still misunderstood among the general public in regard to some features of our experimental work. For example, in connection with the breeding of cattle and sheep, where so many varieties are obtained from crosses of one kind upon another, there must be not a few *weeds*. Seen among the better ones, they suffer very much by comparison, and, of course, do not look well anywhere, so that it is said they should be culled and placed out of sight. Now, it must be obvious to the larger mind that, as an experimental station, it clearly is part of our duty to allow these weeds, real or apparent—not always real because of appearance—the same place, treatment, and public notice as any of the others, and, if possible, *more publicity*, because of the better lesson that is likely to be conveyed. Seeing a danger is surely better than hiding it. Another example is in connection with field plot experiments, where so many hundreds of kinds are on hand every year; when a set, or individual case, is placed against some other set or individual—whether manures, modes of cultivation, or plant against plant—there must be no interference with the progress of things, unless the same is part of the experiment, and particularly during the growth of what are called uncultivated crops, such as the cereals. Should one plot be more overgrown with weeds than its opponent, it would be wrong to remove these to any material extent, for the simple reason that the experiment might be seriously affected for better or for worse, and in such a case, where damage by weeds is evidently of no small account, it is better to say *nil*, than to prosecute the trial for that season. This will explain why, every year, we have had apparently neglected experimental plots. I may be wrong in some of my views on experimental management, but, right or wrong, the management has been mine, and nobody else is responsible.

A.—*The Animal.*

We have now had five years' experience of systematic field plot and of animal fattening experiments in a great variety of forms, probably too many in the former case, and too few of the latter. All the care and consideration we have been able to devote to soils, plants, manures, modes of cultivation, and kindred field subjects have not, as yet, so far as I am aware, opened up any new road to rapid fortunes in the profession, but they are none the less valuable, and none the less connected with our future work. While we have shown the Province what may and may not be expected from the application of certain fertilizers to certain crops under certain conditions, and particularly their relation and conduct in comparison with farm-yard manure, the range of some of the most interesting of them demands years and years to come.

With regard to the fattening and improvement of animals, much more, comparatively, has been elicited. The eighteen distinct kinds of experiments we have made with swine, sheep, and cattle up to May, 1880, have called forth many criticisms for and against, both at home and abroad. We have received, without exception, unanimous encouragement to further prosecution of the valuable relationships of food to animal life, and now again, therefore, it is my privilege and honour to submit what was done here during the winter of 1880-81.

I beg particularly to draw attention to the striking results in the fattening of cattle with hay and roots, *prepared* and *unprepared*, as also with three kinds of grain—such a difference that, subject to corroboration by further repeated trials, would make 7,200,000 additional pounds of beef in our present annual export, say, \$420,000 in value; and the question of two or three year old beef is also very clearly a paramount Canadian one, meaning at least \$1,000,000 a year in loss or gain.

The other subjects deserve a careful reading by all our farmers, and as the agent of the Government in these matters, it is my duty, through you, to bring under the notice of the country, thus prominently, what the eminent Dr. Lawes, of England, says in regard to some facts in this work of The Ontario Experimental Farm.

I.—PREPARED AND UNPREPARED HAY AND ROOTS IN THE FATTENING OF CATTLE.

Not a few of our leading breeders and fatteners of live stock, especially those having leanings to Scotch practice, are strong advocates of the use of whole hay and whole turnips; they say it is much more natural, that health is better, and the animals consequently give a better account of such a form of food than when cut and pulped; they argue that a ruminating animal must get its principal sustenance in the rough condition, as without it the chewing of the cud is so far affected as to seriously injure healthy breeding and development. On the other hand some good practical men maintain that many of the unavoidable conditions of management now-a-days are so unnatural, and so full of the high-pressure of the age that we can make the animals to suit our wants as much as any other phase of rural economy; they contend that by partly preparing the food the animal is the better able to meet the extra conditions imposed upon it, particularly in regard to early maturing, or prematuring, for beef. And while the latter cannot gainsay the fact of extra cost in preparation, they are clear in showing that the rougher unpalatable and even unsound kinds of food, can be safely and economically worked up.

Having in view the making of some light on this subject we undertook an experiment with yearling and two-year old steers, from the 13th December, 1880, to the 12th April last. The yearlings, 18 months old, were of our own breeding: two well-bred Shorthorn grades, one a Hereford, (first) cross—Hereford bull upon a Shorthorn grade; and the fourth an Ayrshire, (first) cross—Ayrshire bull upon a Canadian cow. The four two-year olds, then two and one-half year old, were bought from Wm. Whitelaw, of Guelph, being good specimens of the well-bred grade Shorthorn in good condition, neither prime nor low in flesh.

These were very carefully selected and balanced as regards equal qualities for the object in view, and in order to give all an equal chance, each division was allowed two weeks upon its particular form of food previous to actual weighing for the start. They were tied by sliding chain in double stalls in a comfortable, well ventilated, and somewhat dark stable.

It will be obvious to the interested reader that the division of the animals was:

2	two-year olds on unprepared food.
2	“ “ prepared food.
2	yearlings on unprepared food.
2	“ “ prepared food.

The two-year olds in both examples were offered 90 lbs. of swede turnips, 10 lbs. of hay, 12lbs. of corn meal, and 3 lbs. of bran, per head every day; the yearlings of each example, 60 lbs. turnips, 8 lbs. hay, 6 lbs. corn meal, and 2 lbs. of bran. Everything was weighed at each meal, and the times of feeding were daily at

7 a.m.	.....	turnips and hay.
8.30 a.m.	.....	meal and bran.
11.30 a.m.	.....	turnips and hay.
1.30 p.m.	.....	meal and bran.
4 p.m.	.....	turnips and hay.
8 p.m.	.....	meal and bran.

They were allowed fifteen minutes for exercise, and water at 11 a.m. every day. The prepared food was made by mixing pulped turnips and cut hay, of inch lengths, in the proportions named; all the animals were weighed each week.

Thus then prepared and unprepared turnips and hay continued for fifteen weeks. Nothing occurred to mar the experiment, except perhaps a sort of general indisposition of one of the two-year olds on unprepared food, or rather by not being such a good “thrifer” as the others, not evidently any disease or sickness properly speaking, as it always gained in weight except twice, though not proportionately to others every week.

I beg to make particular note of the character of the weather during winter 1880-81 as a great deal of the success or non-success of animal fattening depends on regularity in this as in any other thing. We have in all our experience gathered the important fact that alternations of much frost and many thawings seriously affect the rate of progress, that mild winters are not so good as steady moderate frosty ones, and as the past winter was unusually regular in respect of frost, with very few thawings, the result must have been very favourable to this experiment. During day time the thermometer was rarely over 37° by reason of much going and coming of people, and not more than 45° during night when doors were closed.

Our next duty is to record the total quantities of food consumed, *per head*, during 105 days.

CATTLE.	Turnips. Lbs.	Hay. Lbs.	Corn-Meal. Lbs.	Bran. Lbs.	Total Quantity of Materials.
Two-year old	8820	980	1029	196	11,025
Yearling	5880	784	735	147	7,546

In this we have evidence of a 1,500 lbs. steer—the average of the two-year-olds during the experiment—being able to consume its own weight of different materials every fourteen days, and the yearlings (average 1,050), very little less. Of course this depends upon large feeding value in small bulk, or small feeding value in large bulk—turnips and hay on the one hand, and meal on the other hand. The two classes of animals were therefore, according to weight, and age it may be, fed alike as regards *quantity*, if not by class to suit growth of bone and muscle in the case of the younger ones, or to lay on flesh and fat in that of the older ones.

What then was the respective increase per head of these animals under such treatment?

	Weight on Entry.	Weight at Finish.	Increase per Head per day.	Total Increase.
UNPREPARED FOOD :	Lbs.	Lbs.	Lbs.	Lbs.
Two-year-olds	1366	1553	1.77	187
Yearlings	1028	1212	1.75	184
PREPARED FOOD :				
Two-year-olds	1477	1705	2.17	228
Yearlings	878	1090	2.02	212

Taking the two-year old cattle, which were finished when $36\frac{1}{2}$ months old, those that entered at an average weight of 1,366 lbs. on *unprepared* food, came out with an average of 1,553, thus gaining 187 lbs. each during 105 days, or a mean daily rate of 1.77 lbs.; the same age of animals on *prepared* food began with 1,477 lbs., and made up to an average of 1,705 lbs. each in the same period, gaining 228 lbs, or a mean rate of 2.17 lbs. per day. It will be noted that, of this class, those on *prepared* food had, on entry, a greater average by 111 lbs. per head, but this, in place of being an advantage, as many may suppose, was perhaps a disadvantage because of the well-known fact that young light cattle increase in weight at a greater ratio than older, heavier ones; this fact is not necessarily

illustrated in particular experiments such as this, yet it will be observed that the yearling cattle on *unprepared* food made, practically, as great a daily increase as the two-year-olds by the like management, and a much greater *in proportion to original weight*. In fact, when we look at all the results in this light it will be found, as explained in another chapter, that the yearlings increased on an average over 20 per cent., and the two-year-olds only 14 per cent. upon their original weights. But to return to the subject more immediately on hand: we have a decided advantage by the use of *prepared* hay and roots to the extent of no less than 40 lbs. per head per day, or nearly one-half pound, in the case of cattle finishing at three years old.

Then again, in the case of the yearling cattle, those upon *unprepared* food entered with an average weight of 1,028 lbs., and came out at 1,212 lbs. each, making 184 lbs., or a daily rate of 1.75, while those of the same age upon *prepared* food, going in at 878, made an average of 1,090 lbs., which is equal to 2.02 lbs. per head per day. Here also we obtain a distinct advantage of .27 lb. per head per day—say fully $\frac{1}{4}$ of a pound—by the use of prepared hay and roots over that unprepared.

Placing together the two ages of cattle upon the same form of food, we have a mean of 1.76 lbs. per head per day for the *unprepared*, and 2.10 lbs. as that of the *prepared*, or a whole difference of .34 lb.—being equal to $\frac{1}{3}$ of a pound per head per day in favour of the prepared food all over.

All this is very interesting and valuable, and in order to satisfy any doubts that may arise in regard to the probable sickness of one of the steers already referred to under the unprepared food regime, I beg to show that had this animal done as well as his “mate,” which stood as high as 2.20 lbs. per day, the unprepared food results would have made a record higher than the mean of the other; but then, on the other hand, when we do the same thing in the case of the *prepared* food, the result is still a little in favour of the latter position, so that altogether we must meantime stand to our averages and hold according to the figures obtained.

The Province of Ontario has been preparing during the past winter about 100,000 head of three-year-old cattle for the British market, and assuming, for the sake of applying this lesson, that they have all been of the same stamp and treated to rough or unprepared food, similar to our experiment during six months of stall-feeding, the loss will have been 7,200,000 lbs. of beef, or 5,000 head of cattle,—value at least \$420,000.

Though not part of the experiment proper, it will nevertheless be interesting to make a memorandum of the debit and credit of these three-year-old steers:

Unprepared Food:

Bought 1,366 lbs. (average steer) @ 5 cents.....	\$68 30
Sold 1,553 lbs. (average steer) @ 7 cents.....	108 71
	<hr/>
	\$40 41

Prepared Food:

Bought 1,477 lbs. (average steer) @ 5 cents.....	73 83
Sold 1,705 lbs. (average steer) @ 7 cents.....	119 35
	<hr/>
	\$45 52
Difference in favour of <i>prepared</i> food.....	5 11

The question would now be—for it is a question of numbers—how many cattle would it take to profitably employ extra labour in preparing the food, at the same time remembering the point of working up poor materials, and such others as previously indicated?

II.—THE COST AND PROFIT OF TWO AND THREE-YEAR-OLD STEERS.

In my evidence before the Ontario Agricultural Commission last year, I had occasion to advert to the importance of paying more attention to finishing our beefing cattle at an earlier age than prevails by present practice. As corroborative of this position I beg to

submit some figures upon the relative growth, cost, and value of steers between 18 and 36 months old, as obtained by recent experience here.

Four head, averaging 18 months old, were tied up on 13th October, and withdrawn on 1st May following. They entered at an average weight of 837 lbs. and stood at 1,187 lbs. each at the end of 200 days. The rate of progress here was $1\frac{3}{4}$ lb. per head per day, or just equal to the average of the best three-year old-steers. Now, what does this imply? This: A cattle beast destined for the shambles, having been well done to in nursing and after treatment up to 18 months, is put into the stall in order to premature with the view of immediate disposal for food. Entering this new stage at a weight, as we have seen, of 837 lbs.—which shows a previous rate of less than $1\frac{1}{2}$ lbs. per day (from birth to eighteen months old), it is served to extra treatment in the shape of 8 lbs. hay, 60 lbs. turnips, $7\frac{1}{2}$ lbs. corn meal and $1\frac{1}{2}$ lbs. bran, until 24 months old. It is then sold for $5\frac{1}{2}$ cents per pound live weight, or \$65.28. The same animal put to grass, and carried on through another winter to 37 months old, will weigh, under the best management, 1,648 lbs., and fetch in these times \$107. Which pays best?

Two-Year-Old Steer.

DEBIT.	\$ c.	CREDIT.	\$ c.
Price of 18 months' old steer,—837 lbs. at $3\frac{1}{2}$ c.	29 29	Price of 24 months' old steer—1187 lbs. at $5\frac{1}{2}$ c.	65 28
Cost of food for six months of winter— 1600 lbs. hay, at \$10 per ton, .. \$8 00 200 bus. turnips at 8c. 16 00 1500 lbs. corn meal 15 00 300 lbs. bran at $\frac{1}{2}$ c. 1 50	40 50	Difference between <i>cost</i> price and <i>market</i> price of food used (see Chapter III., herewith)	13 08
Attendance	5 00	Value of manure obtained during six months (see Chapter IV. herewith) .	16 61
Bedding	4 00		
Risks (one death in 100)	0 50		
Total debit	79 29		
Credit balance	15 68		
	94 97	Total Credit	94 97

Three-Year Old Steer.

DEBIT.	\$ c.	CREDIT.	\$ c.
Total debit from two-year-old	79 29	Value of summer manure	3 50
Summer grazing and attendance, 5 mos. at \$1.50.	7 50	Difference between <i>cost</i> price and <i>market</i> price of second winter's food	22 04
Grain allowance while on grass, 500 lbs. Cost of food in stall, one month of fall and 6 after—	5 00	Value of manure obtained during second winter	31 35
Mangolds, 6600 lbs. \$11 00			56 89
Turnips, 13,200 lbs. 8 80		Value of three-year-old steer, 1648 lbs. at $6\frac{1}{2}$ c.	107 12
Straw, 806 lbs. 2 02			
Corn fodder, 806 lbs. 2 02			
Hay, 806 lbs. 4 02			
Pea meal, 1210 lbs. 12 10			
Corn meal, 1210 lbs. 12 10			
Bran, 440 lbs. 2 20	54 26		
	146 07		
Attendance, bedding and risks	10 00		
Interest on \$65.28 for 12 months at 6 p. c.	3 90		
Total debit	159 97		
Clear credit balance	4 04		
	164 01	Total Credit	164 01

There is but one sound way of arriving at the cost of producing beef or flesh of any kind, that is, to charge the animal with everything it consumes, uses, or requires in any form, either as food, bedding, or attendance; and it is just as plain and reasonable that in whatever way that animal accounts for these things, it must get credit therefor—all according to current market prices or acknowledged value in whatever form. I have hitherto followed this rule very strictly, and see no reason now to change from it except as a means of simplifying or explaining anything. Several explanations are given in other parts of this Advance Report, and the present reference is merely to show that all the items of debit and credit in connection with these two and three-year old steers are correct both in theory and practice.

So then, subject to the quality and firmness of the flesh being equal, it is perfectly plain that there is much more money in getting rid of our beefing steers at two years than by holding them up to three years, under liberal management. I say so upon no estimate or guess work, but solely according to recent experiment, so that no doubt need exist on the subject. Of course, if anybody desires to make heavier beef or to maintain animals as manure manufacturers, the subject of discussion is entirely changed.

But again, it will be obvious to the practical feeder that unless *most liberal* management is carried out from birth to twenty-four months, no cattle beast of that age will be fit for the butcher. And it is just as true that the three-year-old could not be made up to 1,648, or even 1,500 lbs. without similar management, so it would be no argument to say that two-year-olds weighing about 900 or 1,000 lbs. could be bought cheaper than $3\frac{1}{2}$, and brought out more profitably at 36 months than shown by the previous tables.

At the same time I am disposed to give more value to the manure of the three-year-old as against that of the other, and altogether on this important subject, reference should be made to Chapter IV. herewith.

In a stable of 1,000 head of fattening cattle, as for example at Toronto, or at Mr. Wisner's, of Prescott, the difference in favour of two-year-olds would be \$11,640, and for the 100,000 of those annually exported from the Province, the handsome sum of \$1,168,400.

III.—DOES IT PAY TO FATTEN CATTLE FOR MANURE PRODUCTION ONLY?

There really exists no difficulty in setting this question at rest, and the plainest possible way to illustrate it fully is to purchase a two-and-one-half-year old steer at a price equal to what can be got for it when matured six months afterwards, and give no credit for extra weight of flesh produced; or, what will amount to the same thing, get the loan of such an animal, feed it with whatever you choose for ordinary good production of beef, and return to its owner six months afterwards,—in short, will it pay to use the animal system as a manure-making machine only?

In regard to what constitutes the actual value of farm-yard manure, it is necessary here to have a distinct understanding with the average farmer, and accordingly I have to draw his earnest attention to the chapter herewith entitled "The Value of a Manure Heap," wherein is clear proof of the facts that must, at the present time at least, guide all men on this valuable subject.

On the 1st October then we are supplied with the use of a thirty-months old steer, and for the succeeding 220 days it consumes:

$6\frac{1}{2}$ tons swede turnips,
 $3\frac{1}{4}$ " mangolds,
 $1\frac{1}{4}$ " of straw, of kinds.
 $\frac{1}{2}$ ton hay,
 $\frac{1}{2}$ " pea meal,
 $\frac{1}{2}$ " corn meal, and
 $\frac{1}{4}$ " bran.

The *actual cost* of these as produced from the farm amounts to \$31.26, thus :

	<i>Actual Cost.</i>	<i>Market Price.</i>
Turnips.....	\$8 04	\$17 60
Mangolds.....	3 66	11 00
Straw.....	2 40	4 04
Hay.....	1 80	4 04
Pea meal.....	6 06	12 10
Corn meal.....	7 10	12 10
Bran.....	2 20	2 20
	<u>\$31 26</u>	<u>\$63 08</u>

Now, according to the valuation standard of such materials after passing through the animal system, they are actually worth as fertilizers from one three-year-old steer, during 220 days, the sum of \$32.06, as thus detailed :

Turnips, \$1 per ton (of raw materials).....	\$6 50
Mangolds, \$1.25 per ton “.....	4 06
Straw, \$3 per ton “.....	3 75
Hay, \$6 per ton “.....	3 00
Pea meal, \$15 per ton “.....	7 50
Corn meal, \$7.50 per ton “.....	3 75
Bran, \$14 per ton “.....	3 50
	<u>\$32 06</u>

We have then an actual cost of food amounting to \$31.26, against what is understood to be as practical a value, amounting to \$32.06, which *under proper management*, lies as so much money to be invested for future cropping. Put in another way, these droppings are equal to one ton of bone dust, or one ton of mineral superphosphate, laid down on the farm from the manufactory, according to present prices ; but, will any experienced farmer assert that he would rather have either of these special fertilizers than the farm-yard manure from this animal ? Would he give seven tons (which the one steer produces), of such first-class home-made manure for one of bone dust, or of mineral superphosphate, valuable as they be ? Long practical experience in the use of these manures says that for the production of grain, roots, and other crops, four tons of first-class farm-yard manure is more active, more permanent, and more suitable than one ton of either of these special fertilizers.

This then is no fanciful valuation or comparison, and I can see no grounds whatever for doubting the affirmative to the question “Does it pay to fatten or feed cattle for manure production only ?” Any one then who asserts that the feeding of cattle does not pay because, on charging all food against the actual increase of weight of flesh and extra price, the account won’t balance, is either dead to the value of farm-yard manure, or prejudiced against all such advanced views.

IV.—THE VALUE OF A MANURE HEAP.

Too many opportunities cannot be taken of showing the Province what a large sum annually is thrown from everybody’s stable every winter in to the barn court, in the form of what we call farm-yard manure ; that it is actual cash we are thus handling, more so indeed than the beef and mutton being raised at the same time, and as much so as the golden grain that lies so much at the root of man’s daily wants. It will be a golden day indeed for this or any country when the manure heap receives as much respect as the bank account ; better a big manure heap than a bank account any day for the farmer—the one he can use at all times, the other is but a source of annoyance at most times.

During the past winter I took particular note of what went to make the manure heap of this farm, and, in the spring, had it properly squared up, measured and weighed. The

story opens on the 12th October, when we housed and began to feed the following animals, and it ends on 1st May, being therefore 200 days. Of course the number of animals varied to some extent, but taken all over, the following were the average on hand during that period :

15 horses.
 42 cattle, over two years old.
 26 cattle, under two years old.
 8 fattening cattle, over two years.
 107 sheep, breeding.
 33 sheep, under one year.
 25 sheep, fattening.

256 head in all.

These ate, or otherwise disposed of, the following materials :

Hay	173,000	lbs.	
Pea straw	27,000	"	
Barley straw	29,000	"	
Oat straw	58,000	"	
Wheat straw	80,000	"	
Corn straw	18,000	"	
Total fodder			385,000 lbs.
Mangolds	270,000	lbs.	
Turnips	800,000	"	
Carrots	6,000	"	
Total roots			1,076,000 lbs.
Oats	29,000	lbs.	
Barley meal	20,000	"	
Corn meal	25,000	"	
Pea meal	33,000	"	
Bran	40,000	"	
Oilcake	3,000	"	
"Thorley's food."	500	"	
Total grain			150,500 lbs.
Gross quantity			<u>1,611,500 lbs.</u>

There was added directly to the manure heap, at various times :

3,000 lbs. of gypsum.
 15,000 lbs. of materials from cellars, etc.
 18,000 lbs.

So that in accounting for the whole, we have to speak of 1,629,500 lbs.

What became of these 1,611,500 lbs. of food? First we have to credit, or debit :

Extra weight on horses	1,100	lbs.
" " on 42 cattle	2,500	"
Calves produced, as dropped	2,700	"
Extra weight on fattening cattle	2,800	"
" " on breeding sheep	1,600	"
Lambs produced	2,900	"
Extra weight on fattening sheep	1,400	"
Total extra flesh	15,000	"
Milk removed from cows	14,500	"
	<u>29,500</u>	lbs.

For easy calculation it will be best to reduce the 256 animals of all kinds and ages to a representative average; this, as near as possible, is 75 head of three-year old fattening steers, and with these let us now continue the inquiry into this manure heap.

These 75 cattle breathed, perspired, retained, and voided the 1,611,500 lbs. of food enumerated, during 200 days. We have already accounted for the "retained" by the various forms of flesh as above, and have yet to look for 1,582,000 lbs. In doing this it is necessary to explain that the *water*—pure water (which exists in every kind of food in whatever condition)—is usually not reckoned as *food proper* in such calculations, valuable and no doubt indispensable as it is undoubtedly; and as the data by which we have to be guided in these calculations have been established upon the footing of first getting rid of this water, I therefore divide as follows:

		<i>Water.</i>	<i>Food proper.</i>
Fodder, 385,000 lbs. give	57,750	and	327,250
Roots, 1,076,000 "	968,400	"	107,600
Grain, 150,500 "	21,070	"	129,430
<u>1,611,500</u>	<u>1,047,220</u>		<u>564,280</u>

And thirdly, it is found on an average of things, that every such animal as our selected 75 will

Evaporate and breathe 57 per cent. of this "food proper."	
Increase in weight, 6 " from "	
Void, as manure, 37 " of "	
<u>100</u>	

Which therefore makes the following abstract:

Used in breathing and evaporation, 22 lbs. per head per day....	321,600
Increased in weight, 2.25 per head per day	33,850
Voided as manure, 14 lbs. per head per day	208,830
<u>As above</u>	<u>564,280</u>

Allowing the *actual* 29,500 lbs. of flesh and milk to stand against the 33,830 lbs. of *estimated* increase as above, we have to deduct the "vital force" amount—breathing and evaporation—of 321,600 lbs., and manure quantity, 208,830, which leaves 1,051,572 lbs. still to be accounted for. The water of the food equals 1,047,220 lbs., and thus leaves a balance of 4,852 lbs., or just the difference between the two first items, 29,500 and 33,852.

But the manure heap actually weighed	1,065,750
Deduct gypsum, cellar cleanings, etc., and bedding (75,000) ..	93,000
	<u>972,750</u>
Deduct also <i>dry</i> manure voided	208,830
	<u>763,920</u>
Deduct water voided with manure, <i>estimated</i> about 70 per cent. of 691,830, the total weight of animal droppings ..	483,000
	<u>280,920</u>

This quantity of 280,920 lbs. extra in the manure heap has to be accounted for by (1) the retention, and (2) the replacement by hand from tanks, of part of its own liquid, water largely, (3) by addition of water from snow, the heap being uncovered, and (4) *less* so much by fermentation and evaporation in the process of decay. This *one-fourth* difference is not large according to old country experience of loss by fermentation and decay, which is usually one-third and even one-half *less* than the original weight, but still probably large

under the circumstances. These circumstances were an even steady winter, as against an open irregular one, either here or in a more temperate climate. In our case, therefore, with continuous frost, the treading of cattle daily, solidifying and excluding air, the application of gypsum to regulate and retard decay and retain gases, together with the addition of snow, there cannot have been much loss by fermentation and evaporation; and indeed the heap itself said so when being cut up, as greenness was common, with the want of that dark cheesy consistency so well known in ripe farm-yard manure.

WHAT THEN IS THE VALUE OF THIS MANURE HEAP?

How does the ordinary farmer view this part of the subject? He thinks a load, or say a ton, is worth \$1, as got from city stables, and as he can haul two loads per day with one team, on an average of distances, the load is therefore worth \$2.50. He cannot deny this because he does it, and at the same time many of our readers will agree it is a very common saying among farmers that farm-yard manure at home—home made—is worth \$2.50 per ton, because they cannot do without it—they must have it, and from what they know abstractly of its effects upon crops, they judge this figure to be a close estimate of its value.

There is but one other way of valuing this material: Long experience, as obtained by accurate experiments upon many crops, has shown what is the worth of any particular form of manure or fertilizer under a variety of conditions, and thus the practical farmer and the scientist have now laid their heads together and fixed upon a *commercial standard* for most forms of fertilizers—whether superphosphate, gypsum, bone dust, farm-yard manure, or under the more specific titles of nitrogenous, phosphoric, and potash. In the same way we have come to know pretty exactly what certain animals under a variety of conditions do with the food they eat, and thus can tell what the average manure heap consists of. Building upon these facts, I now submit what may be called the “Commercial Value of our 1880-81 Manure Heap”—the materials having passed through the 75 cattle specified, in 200 days:

86 tons Hay, @ \$6.....	\$516
101 “ Straw, of kinds, \$3.....	303
14½ “ Oats, @ \$8.50.....	120
10 “ Barley meal, @ \$5.25.....	52
12½ “ Corn meal, @ \$7.50.....	93
16½ “ Pea meal, @ \$15.....	227
¼ “ Thorley’s Food, @ \$8 (estimated).....	2
20 “ Bran, @ \$14.....	280
1½ “ Oil cake, @ \$23.....	39
3 “ Carrots, @ \$1.....	3
135 “ Mangolds, @ \$1.25.....	169
400 “ Turnips, \$1.....	400
<u>799½</u>	<u>\$2,024</u>

(Average \$2.55 per ton.)

Assuming that these materials represent the average in all respects of Canadian practice for fattening purposes, it appears that every ton given as food is worth \$2.55 after passing through the animal system; that the 1,470 cubic yards of the manure heap weighed 537 tons, which at farmers’ valuation of \$2.50, gives \$1,342 as total value; that the commercial value of \$2,024 is \$1.60 more per ton than the farmer’s; that each animal (of the 75 representatives), made, or was the means of making, seven tons of manure during the winter; that the value of such manure per head amounted to \$18 by the farmer’s valuation, and \$29 according to commercial valuation; and that, under deduction of purchased materials, the 370 cultivated acres of the farm have given about 1¼ ton of manure per acre per annum.

V.—DR. LAWES, OF ROTHAMSTEAD, ENGLAND, ON THE ONTARIO
EXPERIMENTAL FARM FEEDING EXPERIMENTS.

It is safe to assert that no other man has done so much in throwing light upon the agricultural profession as Dr. Lawes, of England. Being a practical farmer, and a practical chemist, with a heavy purse, and a thorough, *enduring* enthusiasm as an experimentalist, he has, in conjunction with Dr. Gilbert, given the world, of late years, many most valuable facts, from the inquiries of some forty years, in regard especially to the relationship of food to animal life.

In our report of 1879, upon the cattle-feeding experiment of that year, I had occasion, in explaining the position of the debit and credit sides of the transaction, to quote Dr. Lawes as authority for the fact that no fattening animal whatever pays for the food it consumes by the *direct increase* of its weight from such food. This seemed to be an interesting and perhaps even a new thing to many in England, for on the 11th February the *Live Stock Journal*, of London, published our chapter of 1879, entitled "What it Costs to Make Beef." To this Dr. Lawes made reply in the same journal; and as the opinion of such an authority always takes the highest place in agricultural literature everywhere, the occasion should not be lost by us in showing Canada what her Experimental Farm has done so far, and what the world thinks of certain branches of her work.

As the whole original article of 1879 and Dr. Lawes' letter are not lengthy, it will be best first of all to reproduce them.

FROM REPORT OF 1879.

What it Costs to Make Beef.

Few of us have any idea, as I have elsewhere remarked, as to the actual cost of feeding, because few of us are in the habit of placing a value upon the produce consumed upon our own farms. Dr. Lawes, of England, recently asserted that in no case would an animal pay for the cost of its food by the direct increase of its weight from such food. What has been our own experience here of late?

1878—To make 1,610 lbs. cost \$193.27, or 12 cents per lb.

1879—To make 4,593 lbs. cost \$636.00, or 13 cents per lb.

6,203	Mean 12½ cents per lb.
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This is charging every possible item in food, bedding, and attendance; and I have no doubt the figures are in correspondence with the average of the country.

So then it costs 12½ cents per lb. live weight to make good beef that is usually sold at 6 cents per lb. live weight! How is this accounted for?

Debit, as above.....	\$0 12½
Credit actual increase at market price for improved beef.	\$0 05½
Credit also for extra quality given by 6,203 lbs. <i>new</i> to 26,139 original lbs.=4 at 2 cents per lb.	0 08
Credit manure, according to chemical value, \$0 06c. }	0 04
“ “ ordinary value, 0 02c. }	
	\$0 17½

Balance, being credit of \$0 05 per lb.

over all animals.

This needs explanation. We purchase a steer, or take one of our own breeding, and put it into regular systematic feeding when 1,163 lbs. weight and worth \$40.70 at 3½ cents per lb. During six months it is fed upon materials that cost, with attendance and bedding, the sum of \$43, which have added 360 lbs. to its weight, thus making the prime

animal 1,523 lbs. But the food has not only added 360 lbs. to weight, *it has improved all the original* 1,163 lbs.—raising them from $3\frac{1}{2}$ to $5\frac{1}{2}$ cents per lb., as a purely marketable subject. It is obvious therefore that the food and its associations have to be credited with what they have done at the ratio of 4, that is every 1 lb. of new weight improved the quality of 4 of the old, thus making 8 cents, as given in the foregoing statement. The real value of manure not being known, or rather, as the chemist and practical farmer do not agree as to its value, I have adopted a mean, or 4 cents, as resulting from the refuse that goes to make every additional pound of flesh.

Our example steer cost originally	\$40 70
And to feed, etc., cost	43 00
	<hr/>
	\$83 70
It sold for	83 76

Showing no profit or loss when all food, etc., is valued, and no other items credited, as shown in the above example of $17\frac{1}{2}$ cents per lb.

But according to honest book-keeping there is, as we have seen, 5 cents per lb. on 360 lbs., or \$18 of clear profit for six months from an investment of \$83, which is equal to 43 per cent. per annum.

LETTER FROM DR. LAWES.

"In the *Live Stock Journal* of February 11th, you publish the result of some experiments in cattle-feeding, made at the Ontario Experimental Farm, which, while they in one sense confirm my views, yet arrive at very different conclusions from mine, owing to the very different estimate of the value of lean as compared with fat stock in Canada and in Great Britain.

"When I stated, some years ago, that the increase upon a fattening animal was of less value than the cost of the food consumed to produce it, I did not intend my remarks to have a world-wide application.

"The Ontario experiments appear to have been carefully carried out. It is stated in the report that a steer weighing 1,163 lbs. increased 360 lbs. in six months. This is nearly 14 lbs. per week increase, or a little over one per cent. increase per week on the weight of the animal, which I consider to be a fair average. The total cost of producing the 360 lbs. was \$43, or £9, which is equivalent to 6d. per lb. As the report puts the case:—'It costs $12\frac{1}{2}$ cents to make good beef, which is usually sold at 6 cents per lb. live weight;' but then the report goes on to show this loss is converted into a profit, because 'the food has not only added 360 lbs. to the weight, it has improved all the original 1,163 lbs., raising them from $3\frac{1}{2}$ cents to $5\frac{1}{2}$ cents per lb.'

"The great distinction between Great Britain and Canada, as regards cattle feeding, is, as I have mentioned above, the very low price of store stock in the latter country. I am now going to make a further statement, which very possibly may be called in question—viz., that we pay more per pound for beef in a lean animal, than we can make of it when fat. I will proceed to give my reasons for holding this opinion, and your readers will thus be able to judge for themselves whether they justify the conclusion to which I have come.

"I will take the case of a bullock of the same weight as that given by way of illustration in the report of the Ontario experiments, and will endeavour to follow out the transaction as it would probably occur in this country.

"A bullock, in good store condition, weighing 1,163 lbs., would give about 53 per cent. carcass; or carcass, 616 lbs., offal, 547 lbs.—1,163 lbs. The increase, 360 lbs., I estimate to contain 70 per cent. carcass; or carcass, 252 lbs., offal, 107 lbs.—359 lbs. By the addition of the two we get in the fat animal, carcass, 868 lbs., offal, 655 lbs.—1,523 lbs.

"This is equal to 57 per cent. of carcass. Now, assuming that the selling price of beef is 8d. per lb., I do not think that a store beast of good quality could be purchased at much under $4\frac{1}{2}$ d. per lb. live weight; which would be equal to $8\frac{1}{2}$ d. per lb. for the carcass, and make the value of an ox weighing 1,163 lbs. £21 16s. It cost in Canada 6d per lb. to add the 360 lbs. weight to the animal, or £9 altogether.

"I estimate that it takes 12 to 13 lbs. of absolutely dry food of good quality to produce 1 lb. of increased live weight; about two tons of food would therefore be consumed in the production of the 360 lbs. increase; this increase I estimate to contain 252 lbs. of butcher's meat, which at 8d. per lb. amounts to £8 8s.

"Now, it is quite evident that no combination of fattening food which we could use in this country could cost as little as £4 4s. per ton, in an absolutely dry state. Swedes, at the purchasing price of 15s. per ton, would cost £6 6s. per ton in a dry state. Therefore, as beef on a lean animal costs as much per pound, if not more, than beef on a fat animal, it is not with us, as it is in Canada, a question of raising each pound of our store stock from 3½d to 5½d. On the contrary, we may be only too thankful if we can start even, and do not pay more for the meat on our store stock than the price for which we can sell it to the butcher when the animals are fat.

"It will be a happy day for British farmers when they are able to purchase cheap store stock from foreign countries, without risk from disease: but until that day arrives I must still adhere to the opinion I have expressed, that a profit in feeding can only be obtained by charging a certain sum to the manure.—J. B. LAWES."

Presuming upon a careful perusal of our original article, I should like to look into Dr. Lawes' statements somewhat fully: When he says he did not mean the remark that I made use of in 1879 to have a world-wide application, he implies, I think, that at the time he advanced it (address to The Berkshire Agricultural Association, 3rd May, 1879), he thought the much smaller cost of food in America might bring about a result entirely different from British practice, but now, he says, his views are confined by our experiments, though through different causes, the chief of which is, "the very different estimate of the value of the lean as compared with fat stock in Canada and in Great Britain." Herein lies the cream of the point at issue, and Dr. Lawes proceeds by saying—"I am now going to make a further statement, which very possibly may be called in question, viz., that we (in Britain) 'pay more per pound for beef in a lean animal, than we can make of it when fat.'" This will be a startling fact, for it is a fact as fully explained in the foregoing letter, even to old experienced hands in Britain, and it is one upon which we in Canada may congratulate ourselves, for, "as beef on a lean animal costs as much per pound, if not more, than beef on a fat animal, it is not with us, as it is in Canada, a question of raising each pound of our store stock from 3½ to 5½ cents. On the contrary, the British farmer may be only too thankful if he can start even, and has not to pay more for the meat on store stock than the price for which he can sell it to the butcher when the animals are fat." Thus, then, the British farmer can only look for profit in feeding by charging a certain sum to the manure.

The reverting question at this point is, is it a matter of fact in Canada that lean or store cattle cost *less* to produce per pound than they do when matured. We have said so in all our previous reports, and the practice of the country in every instance says so. But all commercial practice is no correct test of the *actual cost* of everything, and thus it will now be interesting to ascertain, as exactly as possible, what is the real cost to the producer of a store cattle beast. In doing this, it will be best to keep to the average steer reported upon by me in 1879, and since handled by Dr. Lawes.

COST OF A STORE STEER WEIGHING 1,163 POUNDS, ALIVE, AT 30 MONTHS OLD.

Bull service.....	\$2 00
Half cow's milk during six months.....	11 25
Extra food to calf during nursing.....	2 50
Food of calf, from six to twelve months' old, during winter.....	6 89
Food of yearling steer, twelve months.....	20 04
Food of two-year-old, during six months of summer.....	12 50
	<hr/>
	\$55 18
Attendance and risks.....	6 50
	<hr/>
Total actual debit.....	<u>\$61 68</u>

This is the first time we have publicly attempted to show what it costs to rear a steer from birth to thirty months old. The statement is one which must be most critically examined, and I advance it now for that very purpose, trusting our feeders will spare no pains to thoroughly sift.

A good Shorthorn grade cow is put to the bull on 1st July, and drops a bull calf on 1st April following, which is steered in due course; the calf gets half the mother's milk for six months, along with some grain and green fodder, therefore it is justly chargeable with the one half of the milk—equal, on an average, to 1,500 lbs. at $\frac{3}{4}$ of a cent. per pound. After weaning, when six months old on 1st October, the calf is treated to a regular diet of hay, roots and grain, which, at lowest, is equal to *one-fourth* of what is required by a two-year-old, as shown in Chapter II. herewith; then, for the next twelve months, the summer grazing with some grain to keep up the "calf-flesh," will amount to \$20.04 as above debited, and during the time from 24 to 30 months, which is on grass with grain to suit, the steer's keep cannot be less than \$12.50; these, with a proper allowance for attendance and risks by death, etc., will amount in all to \$61.68.

The animal now weighs 1,163 lbs., and has consequently cost $5\frac{1}{4}$ cents per pound.

But the producer has had an annual revenue from the manufacture of manure; we must credit the steer with the results obtained in this line, as detailed in Chapter III., and according to kinds and quantities of food consumed; this will figure up to \$11.60 for the term of 30 months.

We have now obtained the clear sum of \$50.08 as the actual *cash cost* to the farmer of producing a 30 months old steer that weighs 1,163 lbs., so that were he to sell to the feeder at $4\frac{1}{2}$ cents per pound, he would neither be a gainer nor a loser by that part of the transaction. But it is obvious that were such an animal sold at $3\frac{1}{2}$ cents, as we have put it in 1879, the producer would certainly lose, and the feeder gain, as illustrated. It is well known that steers about 1,000 lbs. live weight did fetch from $3\frac{1}{2}$ to 4 cents, and even now, not more than $4\frac{1}{2}$ cents per pound, or exactly what it costs to produce them, on an average.

The lesson to be drawn from these facts is that no breeder of store stock can be making a safe profit who sells under $4\frac{1}{2}$ cents per pound, and that, as the matured steer at three years, according to present prices, will not fetch over $6\frac{1}{2}$ cents, the feeder cannot safely give more than $4\frac{1}{2}$ cents for the store animal.

VI.—THE COMPARATIVE SIZE, WEIGHT, AND VALUE OF VARIOUS GRADES OF FAT SHEARLING WETHERS.

While we have in previous reports occasionally referred to our farm experience regarding pure breeds, and some grades of sheep, we have never systematically submitted any figures specially upon the size, weight and value of fat shearling wethers as bred and fed here in view as a lesson for the Province.

After all, the great question with the average farmer is not so much what can be got for particular pure breeds of sheep, as which of them will improve his common stock so as to secure the greatest weight and best quality of wool and flesh in the shortest time.

I should hope most of our farmers are now well aware of the important fact that, under the best management, there is always most money in getting rid of fat sheep as shearlings in place of holding them on for another year. It pays best in (1) earlier returns, in (2) greater weight proportionately to time, and (3) in quality of flesh, and (4) in quality of wool. I shall not therefore labour this chapter with any details regarding the conduct of two-shear wethers, except to note that on an average of kinds, the increase to weight during the second year is only at the rate of *one-fifth* pound per head per day—that is, the average shearling of 183 lbs. would not exceed 250 lbs. twelve months afterwards.

We are not able to present the Shropshire Down and Merino so reliably as the others, but will next year, when, from our own breeding and management, more figures should be on hand.

During the last five years we have regularly bred and fattened the first crosses resulting from pure-bred Leicester, Cotswold, Oxford Down, and Southdown rams upon ordinary Canadian ewes ; and as all the management and food has been identical in every detail, the results may be relied upon as valuable for comparison.

Lambs are usually dropped about the middle of March and weaned 1st July, getting some grain at all times, and such other management as was fully shown in our 1880 report on "Fattening of Young Sheep."

Under such treatment we have had, on an average, the following sizes :

	Heart Girth.	Flank Girth.	Length.
	ft. in.	ft. in.	ft. in.
Grade	—	—	—
Cotswold grade	4 3	4 0½	4 2
Leicester grade.....	4 1	4 1	4 0
Oxford Down grade	4 0½	3 11	4 0
Southdown grade	3 11½	3 11½	3 10
Merino grade	—	—	—
Shropshire Down grade	—	—	—
Averages	4 1	4 0	4 0

The two first measurements will be easily understood ; the third is the length of the animal as it stands, taken from the drop of the tail to the mouth, when the head, or face proper, is held in a *horizontal* position, and the tape line tightened from point to point. By this method we get the nearest test of a well-made animal, as all the measurements should practically agree—as they do in these examples.

The Leicester leads in flank girth, and the so-called small Southdown gives nearly as much as the others, and is but little second to the Oxford Down in heart girth also. Some will expect to find a proportionately better heart girth in the Leicester grade, but then they are the most even all through—that is, of the most perfect form—by having the three things agreeing, the Cotswold being the least so.

WEIGHT OF FAT SHEARLING WETHERS.

Grade	150 lbs.
Cotswold grade	199 "
Leicester grade	198 "
Oxford Down grade	177 "
Southdown grade	157 "
Merino grade	145 "
Shropshire Down grade	165 "
Mean	170 "

So, practically, the two long-wools are equal in weight as shearlings, and even to ourselves this result has been somewhat surprising, because we have been accustomed to look upon the Cotswold as a slower and more irregular fattener. That they are so in the latter respect we have already seen ; and while they do not want in weight, they certainly do not

give it proportionately to size of bone or length and height of frame. The two Downs are, relatively to weight, very much greater in girth than either of the long-wools; for example, were girth to be regulated by the standard of 4' 1" to 198 lbs., then the Oxford Down should heart girth *only* 3' 8", and the Southdown 3' 3", in place of 4' 0½" and 3' 11½" respectively.

COST.

In this it will simplify to state generally that, inclusive of all food, proportion of ewe's keep during nursing, dipping, washing, clipping, proportion of sire's service, management, and casualties, an average shearling wether runs up a debit of \$7, presuming that as many are kept as will wholly engage one shepherd's time. Taking this as data, the following is the respective cost of the several grades:

Grade	\$5 00
Cotswold grade	9 30
Leicester grade	8 10
Oxford Down grade	7 40
Southdown grade	6 00
Merino grade	5 50
Shropshire Down grade	7 00
Mean	\$6 90

It is a point, subject to no dispute, that the great roomy raw Cotswold will eat one-half more than the hardy compact Southdown, and the others very much in proportion to their size.

WOOL WEIGHT AND VALUE.

Grade	5 lbs. at 25c.	\$1 25
Cotswold grade	9 " 28c.	2 52
Leicester grade	8 " 28c.	2 24
Oxford Down grade	8 " 35c.	2 80
Southdown grade	6 " 40c.	2 40
Merino grade	7 " 42c.	2 94
Shropshire Down grade	9 " 38c.	3 42
Mean		\$2 51

FLESH VALUE.

While over most parts of this country as yet, "mutton is mutton" of whatever weight, quality, or size, there is nevertheless a decidedly growing recognition of the value of certain kinds over others as regards the mixing of fat and lean. The rough patchy stamp is clearly not in favour, even with our export shippers, and so we have now to record a very different value in flesh for these grades.

Grade	150 lbs. at 5c.	\$7 50
Cotswold grade	199 " 5c.	9 95
Leicester grade	198 " 5c.	9 90
Oxford Down grade	177 " 6c.	10 62
Southdown grade	157 " 6½c.	10 20
Merino grade	145 " 5c.	7 25
Shropshire Down grade	165 " 6c.	9 90
Mean		\$8 05

In conclusion, gather up the items, and make a balance sheet, thus :—

	Carcass.	Wool.	Cost.	Balance.
	\$ c.	\$ c.	\$ c.	\$ c.
Southdown grade	10 20	2 40	6 00	6 60
Shropshire Down grade	9 90	3 42	7 00	6 32
Oxford Down grade	10 62	2 80	7 40	6 02
Merino grade	7 25	2 94	5 50	4 69
Leicester grade	9 90	2 24	8 10	4 04
Grade	7 50	1 25	5 00	3 75
Cotswold grade.....	9 95	2 52	9 30	3 17
Mean.....				4 95

From which we obtain very striking evidence in favour of short and medium-wooled sheep—such figures that, in view of the present export trade, no one need hesitate, even supposing they are fifty per cent. in error.

VII.—CORN, OATS, AND PEAS IN THE FATTENING OF CATTLE.

Supposing all faith were placed in the chemical analysis of any kind of food, and it stood as an invariable fact that the fattening animal made most progress in a given time upon that which contains the most fat and flesh-forming materials in the forms of albuminoids and carbohydrates, it would result that corn, oats and pease made beef best in the order given respectively.

Corn possesses a larger percentage of fatty and oily materials, in comparison with oats and pease, pease being considerably less than oats; corn also has one-fourth more starch than either of the others, though less sugar; oats being four times heavier in sugar than corn or pease. Corn is characterized for its albuminoids, and oats for its carbohydrates. As shewn by the accompanying table, the water in each of these foods is practically alike, and the only remarkable difference not yet referred to is the possession by pease of fully one-half more of what are called *flesh-formers* as against corn and oats.

AVERAGE COMPOSITION OF CORN, OATS AND PEASE.

	CORN.	OATS.	PEASE.
Water	14.50	14.00	14.00
Flesh formers	10.00	11.50	23.50
Fat formers.....	69.00	64.50	50.00
Woody fibre	5.00	7.00	10.00
Mineral matter (Ash)	1.50	3.00	2.50

The interesting and practical point therefore is, Does experience, in most cases, agree with the chemical facts, especially in regard to the fattening of cattle, and what, so far, has been the test of the Ontario Experimental Farm thereanent?

On 25th June we closed an experiment specially arranged with these grains, having been very carefully carried out for 75 days. The animals were fair, but not extra samples of three-year old Shorthorn and Hereford grade steers, one of each in each of the three batches. We had three animals in each of the classes all throughout, but owing to several causes it was considered best to confine the experiment to the six that stood nearest each other in every respect, such as size, quality and apparent disposition. They were allowed to "settle down" by receiving one week's food similar to their subsequent treatment respectively, all being tied up in a cool open shed away from other cattle. As the experiment began on the 12th April, warm weather was soon experienced, so that during the latter part of the term the thermometer was often at 80° and 85° in the shade; this told heavily against the average daily increase per head in comparison with winter practice, but of course it told equally for corn, oats and pease. All grain was roughly ground, being neither fine nor very rough; turnips pulped, and hay long.

In discussing the results of this experiment, we will refer to the average animal of each division.

FOOD CONSUMED DURING 75 DAYS, BY ONE ANIMAL.

Turnips	3,525 lbs.	} For each of the three divisions.
Mangolds	600 "	
Grain	657 "	
Bran	50 "	
Hay	770 "	
Green fodder.....	252 "	

NOTE.—The cattle receiving oats ate one-sixth less hay, and those on corn one-fifth less than above given. Those on pease drank one-third more water than either of the others. When the hay was "clovery" the animals would not take so much roots as when timothy abounded; the change from hay to green fodders did not scour. It was particularly noticeable that more corn came through the animals undigested than either oats or pease. Feeding was conducted, as regards time of day, etc., similar to that specified in Chapter I. Food was weighed at every meal.

RESULT IN INCREASED WEIGHT.

	Weight on Entry.	Weight at Finish.	Total Increase.	Daily Increase.
	lbs.	lbs.	lbs.	lbs.
Corn	1,163	1,271	108	1.44
Oats	1,301	1,411	110	1.47
Pease	1,243	1,388	145	1.94
Mean	1,236	1,357	121	1.62

Corn and oats, therefore, gave a similar daily increase per head, while pease record *one-half pound more daily*. What may be the cause of this? It was not by reason of larger animals at the start, nor greater amount of food, nor any difference whatever in conditions, so far as human skill was concerned, and consequently it must be sought for in the properties of the food. I am not prepared to handle this part of the subject at present, but would again simply draw the attention of the feeder to the few facts already

noted, and particularly to the much greater proportion of *flesh*-forming materials existing in pease, which means the making of more muscle and lean as against the lighter oil and fatty matters.

COST OF PRODUCTION.

Without reference, meantime, to the crediting of any items so as to make a proper balance sheet as exhibited in other parts of this report, it will suffice to note the actual cost of producing the several increased weights. The price of each of the grains will be held at one cent per pound, which they are in the Canadian market on an average at present.

Corn	14 $\frac{1}{2}$	cents per pound.
Oats	14 $\frac{1}{8}$	" "
Pease	11 $\frac{1}{8}$	" "

This is no less than 21 per cent. in favour of pease, which is equivalent to \$4.50 per head of increased profit during one winter's feeding, or \$4,500 in a stable of 1,000 head.

Is there not reflection here for a very important national question with us? Much of our agricultural talk of late has been about the inability of the Province to grow corn and the restriction put upon its importation from the States. But, after all, is corn the cheapest producer of beef—weight for weight and price for price, with other coarse grains easily and cheaply cultivated in Ontario?

VIII.—SUMMARY OF GENERAL CONCLUSIONS.

1. A steady, frosty winter is better than an open one in feeding cattle.
2. An average two or three year old steer will eat its own weight, of different materials, in two weeks.
3. Two and three year old cattle will add one-third of a pound more per head per day to their weight upon prepared hay and roots than upon the same materials unprepared.
4. It is 30 per cent. more profitable to pre-mature and dispose of fattening cattle at two years old than to keep them up to three years.
5. There is no loss in feeding a cattle beast well upon a variety of materials for the sake of the *manure alone*.
6. Farm-yard manure from well-fed cattle, three years old, is worth an average of \$3.30 per ton.
7. A three year old cattle beast, well fed, will give at least one ton of manure every month of winter.
8. No cattle beast whatever will pay for the direct increase to its weight from the consumption of any kind or quantity of food.
9. On an average it costs twelve cents for every additional pound of flesh added to the weight of a two or three year old fattening steer.
10. In this country the market value of store cattle can be increased 36 per cent. during six months of finishing by good feeding.
11. In order to secure a safe profit, no store cattle beast, well done to, can be sold at less than 4 $\frac{1}{2}$ cents per pound (live weight).
12. In the fattening of wethers, to finish as shearlings, the Cotswold and Leicester grades can be made up to 200 pounds, the Oxford Down 180 pounds, and the Southdown (grades) 160 pounds each (live weight).
13. Combining wool and flesh value, the Southdown grade gives the highest returns—as much as double that of the Cotswold grade and 35 per cent. over that of the Leicester grade, as also slightly in advance of the Oxford Down grade.
14. Fattening cattle on oats will eat one-sixth less hay than when receiving corn or pease; those on pea meal will drink one-third more water than those upon corn or oats. Clover lessens the consumption of roots.
15. Apparently about one-fifth of ground corn passes through the cattle beast undigested.
16. Pea meal (rough ground) gives 21 per cent. greater returns in fattening cattle than either corn or oats.

N.B.—In the carrying out of these experiments I have to acknowledge with much pleasure the valuable assistance rendered by all the second year students, and especially on the part of their Committee, Messrs. Leask, Phin and Motherwell; and to Messrs. Leask, Dickinson and Fotheringham as superintendents of the feeding.

All experiments must be repeated again and again ere confidence can be established.

IX.—THE CUTTING-UP OF OUR EXPERIMENTAL CATTLE.

From the pease, oat and corn experiment of 1880-81, we retained four steers in view for Christmas—one each of Hereford and Ayrshire grades, and two Shorthorn grades. They were housed all summer, getting green fodder with pea meal. When sold to Messrs. Mallon & Co., of Toronto, we had their kind permission to superintend the killing and cutting-up, so as to obtain correct percentages, now looked upon as valuable points in the make-up of beefing cattle. This subject receives too little attention among breeders, feeders, butchers and exporters. It will be easy to show how a shipload of fattened cattle can be \$3,000 more or less in value, according to percentage of offal—whether only sixty to the 100, or as much as sixty-six of clean butchers' meat to every 100 lbs. live weight. Nationally, then, we are highly interested even in this one item, and there are others proportionately valuable, which it is now my duty to submit.

The cutting-up value of a fat cattle beast depends upon four things :

Breed,
Sex,
Food, and
Age.

Breed regulates the whole proportion of offal; sex also affects the amount of waste (so called)—being more in the female and less in the male and steer; food very materially increases and lessens the butchers' profit—on the one hand, pasture gives the greater waste, and dry fodder with grain increasing the proportion of clean meat. Age is no secondary agent in all this work, as youth gives flabbiness with more offal, while the more mature makes things firmer, fills up, and offers more tallow.

In the animals we are about to slaughter, therefore, it is necessary to have knowledge of all these influences, with particular reference to their being housed and grain fed all summer.

A Shorthorn grade, in this example, means the second cross of a pure Shorthorn upon an ordinary Canadian cow; and the Hereford and Ayrshire grades were the first crosses from exactly the like cow. The two Shorthorn steers were twins, and had no other nurse but their mother, so that very much allowance must be considered in making comparisons—this must not be forgotten. Food and management were alike to all.

The cutting-up table that follows shows the respective ages in days, killing weight, home weight, and classification of carcass materials, along with percentages of offal to killing weight, of tallow to the same, and the very important one of percentage of clean flesh or butchers' meat to the gross live weight.

It appears, then, that a Shorthorn grade, the average of twin steers, 970 days old, gave $14\frac{1}{2}$ lbs. of offal, $5\frac{1}{2}$ lbs. of tallow, and 63.92 lbs. (say 64 lbs.) of clean meat to every 100 lbs. live weight; this was from a rate of increase of 1.41 lbs. per day. A Hereford grade steer, 1,025 days old, gave $13\frac{1}{2}$ lbs. of offal, $6\frac{1}{4}$ lbs. of tallow, and 64.65 lbs. of clean flesh to every 100 lbs. live weight, from a daily increase of $1\frac{1}{2}$ lbs. during these 1,025 days. And an Ayrshire grade steer, 1,095 days old, gave $15\frac{3}{8}$ lbs. offal, $4\frac{3}{4}$ lbs. tallow, and $63\frac{1}{2}$ lbs. of clean meat to every 100 lbs. live weight, from a daily gain of 1.42 lbs. per day. In comparing these, the Hereford grade has the least percentage of offal, the greatest of tallow, and the greatest percentage of butchers' meat; in all these, the Ayrshire is considerably lowest, while the Shorthorn takes as nearly as possible an intermediate position. While not alike for comparison, because of breeding and of much greater age, I have, nevertheless, thought it interesting to place alongside a forty-four months pure bred Devon steer. Note the lower gain per day, the much greater propor-

tion of tallow and less offal that age (and may-be breed) gives, along with no less than 65 $\frac{3}{4}$ lbs. of clean meat to every 100 of live weight.

THE MARKET VALUE OF FOUR KINDS OF BEEF.

It is not what the butcher wants to “show off” with at Christmas, and for which, as a *business agent*, he gives more than for anything else, but it is what suits the average consumer, who requires the most economical roast or boil at any time. When the farmer feeds, and the butcher cuts up just that stamp of ‘animal from which both the epicure and the uncultivated hungry can be served, we may conclude as having produced the *standard*. Now, what is such a standard, and its application to these under discussion? I purpose to invite examination to this under two heads: 1st, Merit by Appearance; and, 2nd, Merit by Actual Cooking and Consumption.

(1) THEIR MERIT BY APPEARANCE.

The standard of what is called “first-class beef,” without regard to breed, is said to be:

- 1. In general appearance a clear cherry-red.
- 2. Juicy or sappy in appearance.
- 3. Fine smooth grain to the touch.
- 4. Fat and lean well mixed, or marbled.
- 5. Fat of a clear straw colour.
- 6. Suet to be of a brighter shade than the fat, with little fibre, and to crumble easily.
- 7. Loin and ribs to be covered with fat more or less in thickness.
- 8. The sirloin when cut to be about equal thickness at both ends.
- 9. Little bone anywhere.
- 10. Thickness of flesh and fat everywhere.

There are many other ways of putting quality, according to national and individual modes of expression, but these will serve our purpose at present.

In order to submit the four kinds named to this standard, I have much pleasure in giving three illustrations of each, as taken by an artist, strictly according to scale, and in every detail they are well and faithfully done. Each set of cuts being exactly from the same parts of each of the breeds, there is necessarily very much here that must interest not only the people of Canada, but every civilized country. Indeed, this inquiry is one of the fields of our profession that has lain too long untilled; and while I do not say that we are the first to cut turf, I trust we will be the first to establish a series of such illustrations over many years’ coming experience that can be looked to as reliable for universal reference.

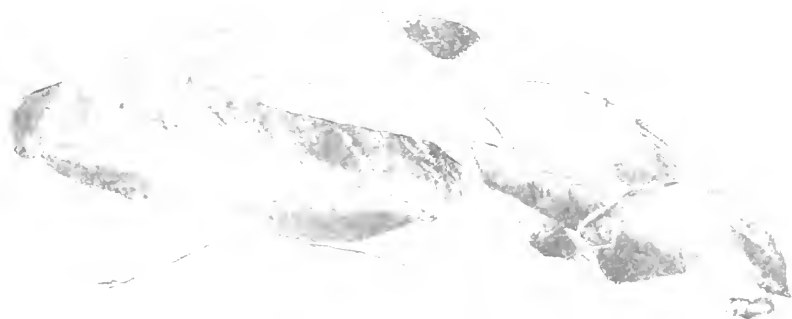
THE CUTTING-UP OF FOUR KINDS OF FAT STEERS.

	Shorthorn Grades.	Hereford Grades.	Ayrshire Grades.	Pure Devon.
Age in days.....	970	1025	1095	1325
Offal.....	lbs. 180 $\frac{1}{2}$	lbs. 194	lbs. 206	lbs. 169
Tallow.....	67 $\frac{1}{2}$	90	63	125
Blood....	66 $\frac{1}{2}$	70	70	87
Head and Feet.....	51	60	59	75

SHORTHORN GRADE.



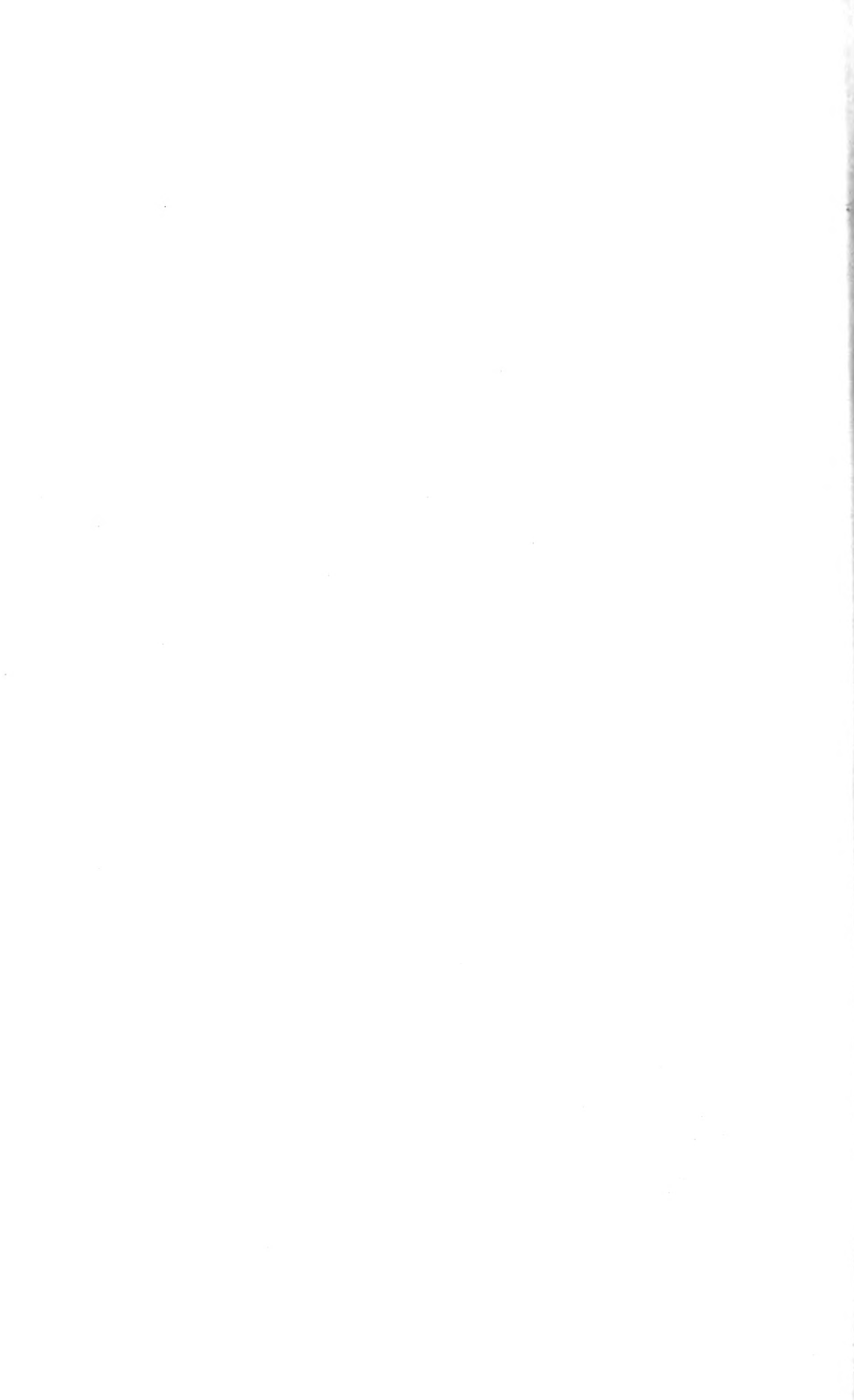
SECOND CUT RIB



SIRLOIN



TENDERLOIN



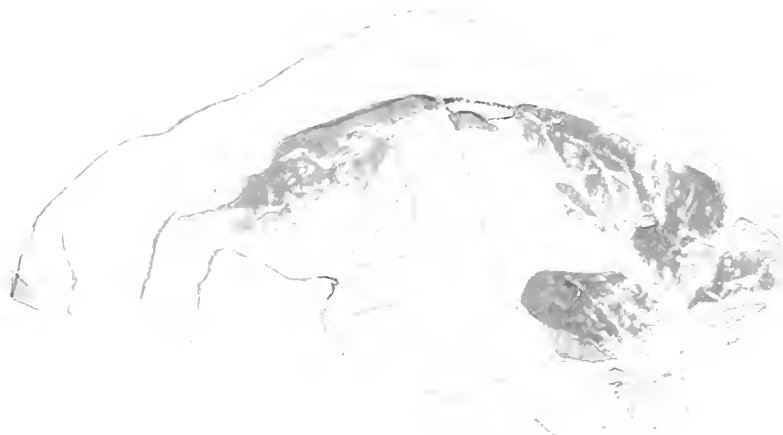
HEREFORD GRADE



SECOND CUT, RIB



SIRLOIN



TENDERLOIN



AMPSHIRE GRADE





PURE DEVON.



Fig. 1.

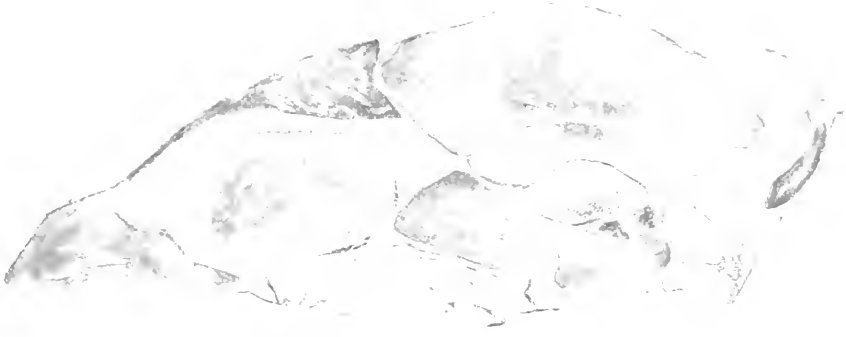


Fig. 2.



Fig. 3.



THE CUTTING-UP OF FOUR KINDS OF FAT STEERS—*continued.*

	Shorthorn Grades.	Hereford Grades.	Ayrshire Grades.	Pure Devon.
Hide and tail	86½	96	86	103
Carcass	801	933	836	1075
Killing weight	1253	1443	1320	1634
Home weight	1357	1536	1443	1706
Daily gain per head	1.41	1.50	1.42	1.28
Percentage of offal to killing weight	14½	13½	15½	10½
Percentage of tallow to killing weight	5½	6¼	4¾	7¾
Percentage of carcass to killing weight	63.92	64.65	63.33	65.78

(2) THEIR MERIT BY ACTUAL COOKING AND EATING.

Boiling.

	Weight before.	Weight after.	Difference.	Per cent. of shrinkage.
Shorthorn Grade	lbs. 7¾	lbs. 6½	lbs. 1½	21
Hereford Grade	6¾	4¾	2	29
Ayrshire Grade	8¾	5¾	2¾	33
Pure Devon	7	4¾	2¼	32
Mean				29

The Shorthorn loses least by boiling, and the Ayrshire most, the Hereford being an exact mean of the four, with Devon nearly as much as the Ayrshire. Of course, in this, some housewives may desire beef that gives off its virtues freely, while others want both good soup and good beef afterwards. Can both be got?

Roasting.

	Weight before	Weight after.	Difference.	Per cent. of shrinkage
Shorthorn Grade	lbs. 7	lbs. 4½	lbs. 2½	39
Hereford Grade	8	6	2	25
Ayrshire Grade	8	5½	2½	32
Pure Devon	6¼	4½	1¾	28
Mean				31

In roasting, the Hereford grade parts with least oil, or other good things; Devon second, Ayrshire grade next, and the Shorthorn seems to be most liberal in parting with these: a very marked contrast to its conduct when boiled.

We submitted the final proof to nine experts, immediately after roasting; opinion, in majority, being given according to last three lines of following table:

12.—ABSTRACT.

Valuation of the flesh of four kinds of fat steers, as bred and fed at the Ontario Experimental Farm.

POINTS.	Value of each point.	Shorthorn. Grade.	Hereford. Grade.	Ayrshire Grade.	Pure Devon.
Clear cherry-red colour	5	5	5	3	3
Juiciness	5	4	5	3	3
Fine smooth grain	5	3	5	3	4
Marbling and mixing	15	15	14	13	11
Clear straw colour of fat.	3	2	3	2	1
Suet colour and fibre.	2	3	3	2	2
Covering of loin and ribs	7	7	5	4	6
Form of sirloin	10	10	6	8	7
Weight of bone	3	2	3	1	3
Flesh and fat distribution	7	7	6	5	4
Boiling	10	10	8	6	7
Roasting	8	5	8	6	7
Eating	20	17	20	19	18
	100	90	91	75	76

In all the work of this, every item was pronounced upon without regard to what the end might be—for or against either of the breeds—and no checking made during its progress. This final table, therefore, is the unbiased opinion of several good judges.

I have to thank Messrs. Mallon & Co., and Mr. Frankland, of Toronto, for cheerful and able help in this somewhat new line of our profession, and special mention must be accorded Mr. Geo. Hood, of Guelph, as well as Mr. Woods, our Farm Foreman.

B.—*The Plant.*

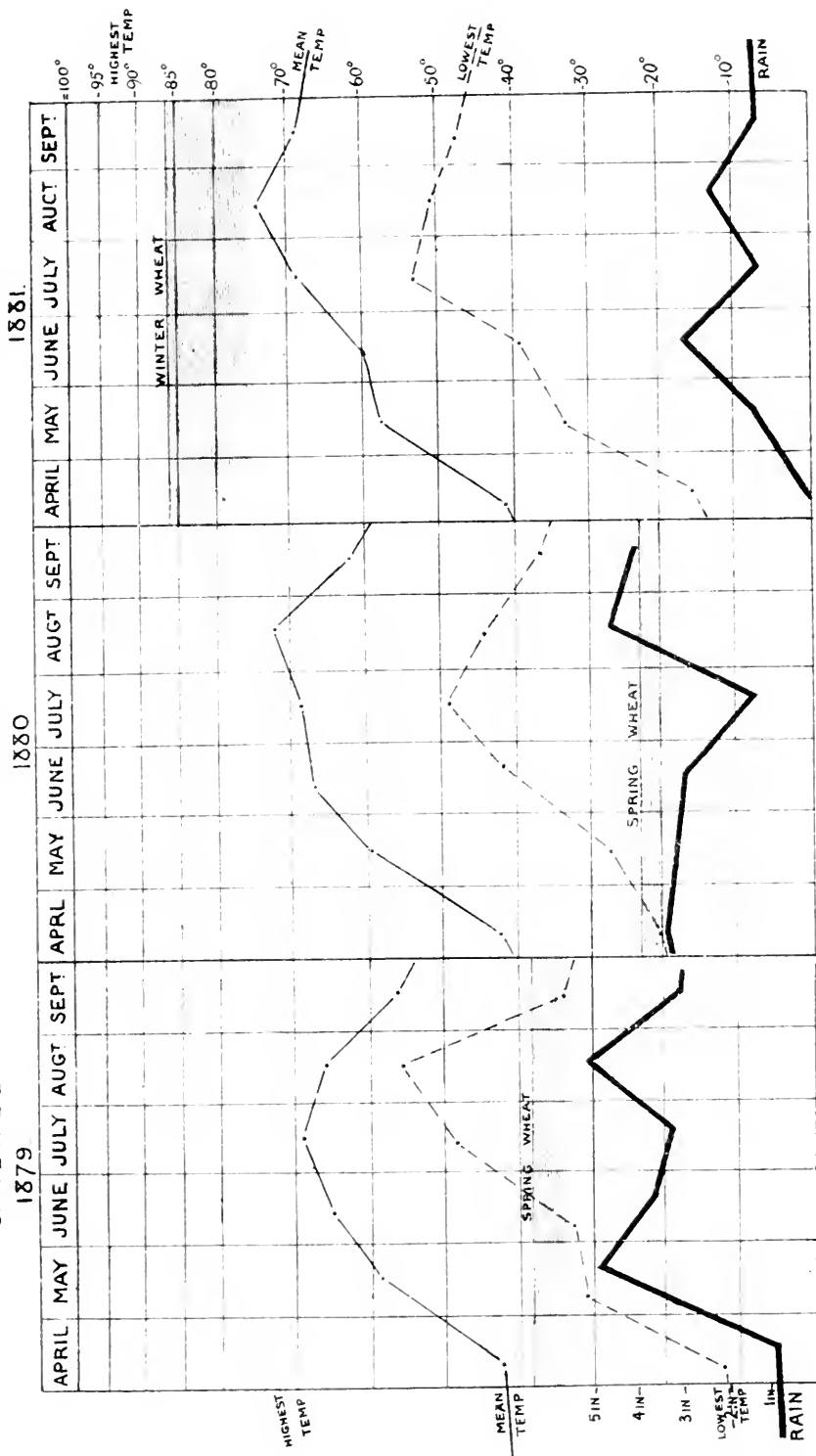
1.—THE THIRD YEAR OF WHEAT AFTER SEVENTEEN FORMS OF MANURE.

Plots 10, 11, and 12—Field B.

What is it that has most influence in the production of crops during a series of years? Is it soil with its food conditions, or climate with its conditions—cultivation being good?

What are we to say of soil that gives us, three years in succession, $17\frac{3}{4}$ bushels of wheat on an average, without manure, and $19\frac{1}{2}$ bushels by the use of seventeen forms of fertilizers? Without manure we had, in 1879, $13\frac{1}{2}$ bushels; in 1880, $8\frac{1}{4}$ bushels of Spring Wheat; and $31\frac{1}{4}$ bushels of Winter Wheat in 1881. As, necessarily, the effects of climate can best be estimated by the conduct of a crop upon *unmanured* land, we shall gather up figures upon this subject as they have been carefully recorded here, and as exhibited in the annexed chart:

CHART OF TEMPERATURE AND RAINFALL TO ACCOMPANY EXPERIMENT OF SUCCESSIVE CROPS OF WHEAT UPON SEVENTEEN FORMS
OF FERTILIZERS THE CROP REPRESENTED BEING THAT WHICH RECEIVED NO MANURE.





On the assumption, then, that temperature and rainfall have more to do with production of crops than the best of soil food conditions, on an average of things, it appears in 1879 the unmanured plot gave $13\frac{1}{2}$ bushels of Spring Wheat, by seeding on 28th April and harvesting on 3rd August; and that was in receipt of a mean temperature of 64° during these 97 days, and of 12 inches of rainfall distributed over 26 days. The same soil with a like crop in 1880 gave $8\frac{1}{4}$ bushels, by seeding on 26th April and harvesting on 6th August, in a mean temperature, for 100 days thereafter, of $67^{\circ} 8'$, and of $7\frac{1}{2}$ inches of rainfall scattered over 48 days; while under a crop of Winter Wheat during 1881, that was harvested on 21st July, the yield was $31\frac{1}{4}$ bushels of grain under a May, June, and July mean temperature of 61° , and a rainfall of $5\frac{1}{2}$ inches scattered over 24 days—thus tabulated:—

Year.	Mean Temperature.	Duration of growth in days.	Rainfall.		Crop.
			in.	days.	
1879	64°	97	12	26	$13\frac{1}{2}$ bushels Spring Wheat.
1880	$67^{\circ} 8'$	100	$7\frac{1}{2}$	48	$8\frac{1}{4}$ " "
1881	61°		$5\frac{1}{2}$	24	$31\frac{1}{4}$ " Winter Wheat.

In the order of amount of grain per acre the following shows the cropping of 1881:—

	Grain in bushels.	Straw in lbs.	Weight of grain per bushel.
Farm-yard Manure and Nitrate of Soda (a)	41	3,690	$64\frac{1}{2}$
" " " "	40	3,390	64
Lime Compost.....	$38\frac{1}{2}$	2,955	$62\frac{1}{2}$
Farm-yard Manure and Salt	$35\frac{1}{2}$	2,940	$63\frac{1}{2}$
Farm-yard Manure and Bone Dust (a)	35	2,940	$63\frac{1}{2}$
Farm-yard Manure and Gypsum	$32\frac{1}{2}$	2,685	$63\frac{3}{4}$
Nitrate of Soda.....	$31\frac{1}{2}$	2,730	63
Farm-yard Manure and Bone Dust	$31\frac{1}{2}$	2,685	$63\frac{1}{2}$
No Manure.....	$31\frac{1}{2}$	2,565	64
Farm-yard Manure and Mineral Superphosphate (a)	31	2,520	$64\frac{1}{2}$
Farm-yard Manure	$30\frac{1}{2}$	2,610	64
Farm-yard Manure and Mineral Superphosphate	$30\frac{1}{2}$	2,730	$63\frac{1}{2}$
Mineral Superphosphate	$29\frac{1}{2}$	2,400	$64\frac{1}{2}$
Farm-yard Manure and Gypsum (a)	$28\frac{1}{2}$	2,460	63
Farm-yard Manure and Salt (a)	$28\frac{1}{2}$	2,370	63
Salt.....	28	2,130	64
Gypsum	28	2,355	63
Bone Dust	26	2,040	$62\frac{1}{2}$
Mean	$33\frac{1}{2}$	2,677	$63\frac{1}{2}$

It will now be in order to illustrate what each form of fertilizer has done for the three year period just terminated.

15½ bushels.	Mineral Superphosphate
15½ bushels.	Bone Dust.
16¾ bushels.	Salt.
17½ bushels.	Nitrate of Soda.
17½ bushels.	Gypsum.
17½ bushels.	Farm-yard Manure.
17½ bushels.	Without Manure.
18 bushels.	Farm-yard Manure and Mineral Superphosphate.
19½ bushels.	Farm-yard Manure and Salt.
19½ bushels.	Farm-yard Manure and Gypsum.
20 bushels.	Farm-yard Manure and Bone Dust.
22½ bushels.	Lime Compost.
23½ bushels.	Farm-yard Manure and Nitrate of Soda.

Diagram showing average annual produce of Wheat, during three years, since application of twelve forms of fertilizers.

At the present stage of this experiment, therefore, four facts stand boldly out :

1st.—That all the *mineral* fertilizers range below the produce that has been received from land *unmanured*.

2nd.—That farm-yard manure alone has given no more than that unmanured.

3rd.—That everything giving a produce greater than that unmanured is from an association of farm-yard manure and mineral fertilizers, lime compost excepted ; and

4th.—That a compost of earth (decayed vegetable matter and lime) is second only to one in all the contest.

Take the first fact, and consider why it is that neither gypsum, nitrate of soda, salt, bone dust, nor mineral superphosphate have, on an average of three years, done nothing in producing extra crops. During the first season they gave conjointly $16\frac{1}{2}$ bushels, as against the $13\frac{1}{2}$ from the unmanured plot ; for the second season they gave $5\frac{1}{6}$ bushels, to the $8\frac{1}{2}$ for that unmanured ; and $28\frac{1}{2}$ for the third year, in comparison with $31\frac{1}{2}$ from unmanured land.

Consider, also, what conditions have so nullified farm-yard manure during three years, which in no single instance gave an indication of its existence.

Also note the very striking results comparatively, when any of these special manures are associated with farm-yard—in every instance making a produce superior to those from farm-yard alone and the unmanured.

And a very valuable lesson is certainly deducible from the position taken by lime compost as a producer of grain.

In criticising these things briefly, we take our stand on two well-known things. We do not know with any measure of certainty, because the country's experience of them is short and limited, what the conduct of special fertilizers is under a variety of conditions—soil, temperature, rainfall and crop ; but we know what farm-yard manure is expected to do, and, of course, in addition to this, we have the surer base of comparison with a crop that has not been treated to any form of manure.

In a previous Report we got rid of the question of effects of manurial application, and showed that the land under this experiment was neither in a high state of cultivation nor had been highly manured. It is obvious then that we must fall back upon conditions other than soil ones.

It seems to me, under these circumstances, to be impossible to gainsay the fact that CLIMATE has been the prime regulator of growth for the period named. The conditions of temperature and rainfall have been such as rendered, in all likelihood, soil help unnecessary in the case of manures not in association. The case would not be so evident were farm-yard manure out of this non-producing list, because the special fertilizers are special—unusual, so to speak—and certainly not so natural. It is a strong ground to take, that as farm-yard manure failed to act, there must have been such a combination of temperature and rainfall as made its usual fertilizing effects inoperative.

On the other hand, we have evidence of fertilizing action on the part of all those specials and farm-yard manure when they are placed together. In 1879 they gave, in every instance, much superior crops to the farm-yard and unmanured portions ; in 1880 they did not give, in any one example, anything over those two standards ; while in 1881 they again overreached them.

Here again, therefore, is clear proof of an overruling influence of climate, especially referable to the year 1880. By the chart and abstract thereof we observe an unusually high mean temperature, and a moderate rainfall, extending over no fewer than 48 days out of the 100—such a small amount of moisture per day as must have seldom reached the roots of plants, when the rapid evaporation is considered.

But why did the manures act when in combination ? The chemist can best tell. Meantime we gather the interesting and highly valuable fact for the Canadian farmer, that one of the reasons of the permanent fertility of their soils, in comparison with Britain, is owing apparently to the more propitious character of climate to the growth of plants—wheat especially.

2.—THE EFFECTS OF BONE DUST, MINERAL SUPERPHOSPHATE, GYPSUM, AND NITRATE OF SODA, APPLIED IN 1878.

Plot 29, Field C.

As a variety in the representation of this, one of our oldest and most reliable experiments, I beg to submit diagram, showing the four years' results from these four important fertilizers, in the production of *Oats, Barley, Wheat, Carrots, Sugar-Beet, Turnips* and *Mangolds*.

Average produce in lbs. per annum, from use of Fertilizers applied in 1878.

Bone Dust	39,110.
Gypsum	28,603.
Mineral Superphosphate ..	32,669.
Nitrate of Soda	34,122.

This is the cumulative result, which does not necessarily indicate the reliable or most permanent character of either of these special manures. If 1881 crop (Winter Wheat) has been influenced more by soil food than by atmospheric conditions, then the following should tell which holds out best :

1881 Cropping.

Bone Dust	4,762 lbs.
Mineral Superphosphates ..	4,020 lbs.
Gypsum	3,448 lbs.
Nitrate of Soda	3,160 lbs.

Here we have a true representation of the usually understood permanent character of these fertilizers, and it remains for coming years to verify.

3.—GREEN FODDER CROPS, 1881.

As usual, we have a large variety of these, and as the season was particularly severe on all kinds of vegetation, by reason of protracted drought, it is important to note the conduct of what is expected to make up for scant pastures.

Prickly Comfrey.

Planted in 1879 ; cultivated, sets four feet apart each way.

May 27th	cut $9\frac{1}{2}$ tons per acre.
July 13th	" $2\frac{1}{2}$ "
September 1st	" $2\frac{1}{2}$ "
October 7th	" $1\frac{1}{4}$ "
<hr/>	
15 $\frac{3}{4}$ tons per acre.	

Red Clover.

Sown spring, 1880 ; ploughed for corn fodder on 1st June.

Plot 2.—May 30th—Cut $6\frac{1}{2}$ tons per acre.

Plot 3.—June 6th.—1st cut..... 8 tons per acre.

July 23rd.—2nd cut 3 "

September..... third growth left uncut

11 tons per acre.

Corn (after Clover).

June 4th.—Drilled, but a failure.

July 2nd.—Drilled second time.

September 4th.—Cut 8 tons per acre.

Rye (Winter).

Sown 3rd October, 1880. Late, thin, and winter-killed

June 6th.—Cut $4\frac{1}{4}$ tons per acre.

Rye (Spring).

May 7th.—Sowed.

July 2nd.—Cut 3 tons 20 lbs. per acre.

Rape (after Rye).

June 18th.—Seeded in drill ; dry, poor seed bed.

October 7th.—Cut $3\frac{1}{4}$ tons.

Hungarian Grass.

June 10th.—Sowed ; ground dry and lumpy.

August 17th.—Cut $4\frac{1}{2}$ tons per acre.

Sainfoin.

Sown spring, 1880 ; half covered with plants.

June 11th.—Cut 3 tons per acre.

Tares and Oats.

May 7th.—Sowed equal parts by measure—2 bushels per acre.

July 25th.—Cut 9 tons 180 lbs. per acre.

*Lucerne.**(Seeded in 1876 and 1880.)*

May 19th, 1st cut	4	tons, 830 lbs. per acre.
June 29th, 2nd "	5 $\frac{1}{2}$	"
July 21st, 3rd "	5 $\frac{1}{4}$	"
August 11th, 4th cut	2	" 700 lbs. "
Total	17 $\frac{1}{2}$	"

By monthly produce we had, therefore, of green fodders to help in stables or on fields:—

May	20 $\frac{1}{2}$	tons per acre.
June	20 $\frac{3}{4}$	"
July	22 $\frac{3}{4}$	"
August	6 $\frac{1}{2}$	"
September	10 $\frac{1}{2}$	"
October	4 $\frac{1}{2}$	"
Monthly mean	14	"

Or thus illustrated in order of earliness:—

KINDS.	May.	June.	July.	August.	September	October.
Lucerne						
Prickly Comfrey						
Red Clover						
Rye (Winter)						
Sanfoin						
Rye (Spring)						
Tare and Oats						
Hungarian Grass						
Corn						
Rape						

3.—PERMANENT PASTURE.

We cannot too often impress upon the Province that, in connection with mixed farming, root cultivation and so much permanent pasture are the building up of our best agriculture—they are the surest foundation of our future success. A big chapter could be written on this subject, but all that can be looked for in this report is to abstract its important features, and hint at some of its advantages:—

(1) IT GIVES SEVERAL CROPS PER ANNUM.

When a variety of grasses and clovers are established in association, the case is one much similar to what nature, under the best of circumstances, offers to animal life—a change every week from May to October. It is then a point to be studied in choosing

the kinds, that they do not all, or even many of them, come during one month or leave off altogether at the same time of the year, but come and mature and go off, if possible, in regular succession from spring to autumn. Thus every week, or every month at least, is equal to a change of field, and secures the value so much desired through such conditions.

Beginning in 1878, we have had great satisfaction in handling nine grasses and five clovers in connection with this subject, as thus illustrated, showing the order in which they come, and their duration each season. Of course the red clover generally leaves us after two years, but it is well to have a little at the start in order to get all we possibly can.

Grasses and Clovers for permanent pasture as found reliable in Ontario.

NAME.	May.	June.	July.	August.	September	October.
Lucerne						
Red Clover						
Rye Grasses						
Meadow Fescue Grass						
Yellow Clover						
White "						
Fan Oat Grass						
Orchard "						
Kentucky Blue Grass						
Alsike Clover						
Timothy Grass						
Red-top "						
Bent "						

The quantity of each may be as follows :—

Grasses.

Timothy	7 lbs.
Orchard	4 "
Italian Rye	2 "
Perennial Rye	2 "
Fan Oat	2 "
Red-top	2 "
Meadow Fescue	3 "
Bent	1 "
Kentucky Blue	2 "
	—
	25 "

Clovers.

Lucerne	4 lbs.
White	3 "
Red	1 "
Alsike	1 "
Yellow	1 "
	—
	10 "
Grasses	25 "
	—
Per acre	35 "

NOTE.—The Rye grasses will hold in the most favourable positions in Ontario, in association with others, but rarely alone: they are the best English fodder plants, and should be encouraged with us.

(2) IT OFFERS AN EARLIER AND LATER BITE THAN OTHER PASTURES.

It is a well-known fact in the growth of pastures where a number of different plants exist, that by such an association there is mutual support, nursing, and shelter, which give early and late growth. In our own experience we have much earlier offers than what are represented in the foregoing diagram, many of the grasses and clovers coming in middle and end of May. The value of this early bite is something incalculable after a long, close winter, and particularly, it meets the heavy "back-going" of which we see so much in ordinary practice among cattle and sheep. So also, the rich "foggage" sends on deep into winter.

(3) ANIMALS ARE MORE HEALTHY AND LESS LIABLE TO DISEASE UPON IT.

All experience goes to show that browsing animals more than others require change of food often, not only in the form of soft succulent growth, but harder and woody matters at the same time. Some of the grasses and clovers are also directly medicinal to cattle and sheep, so that altogether, with a choice of ten or twelve throughout the season, health is better and diseases less frequent.

(4) IT CANNOT POSSIBLY BE DESTROYED BY DROUGHT OR FROST.

The immense importance of this needs little comment—it comes strongly home to us in this country. It is obvious that as association of plants and roots gives mutual support and protection with a close surface, there is necessarily much less risk of damage when rain is scarce and heat abundant—much less evaporation and less "cracking" of the surface. As crop after crop succeeds each other week by week and month by month, the soil is not exposed to the burning sun, and moisture is retained to nourish at all times. Then again, if winter or summer excesses do kill two or three kinds, there remains enough to make the pasture still of greater value than anything else. All through the very severe drought of this season our permanent pasture was never bare, never wanting a fresh bite, but so close and strong that we had to separate with the hand in order to view the surface soil.

(5) IT GIVES MORE DAIRY PRODUCE THAN ANY OTHER FORM OF FODDER.

During the last half century the best managed old pastures of England have stood at more value per acre than the richest arable land, partly because of their permanency of crops, and largely because of their being able to graze *three cows per acre*. There seems no reason why Ontario cannot do *one-third as well* as this, and I am convinced it can be done. For three years in succession on our farm, on a small scale, on comparatively old permanent pasture, and on that of two years' standing, we have clearly proved that *seven sheep* per acre can be well done to. This is equivalent to one and one-quarter cow per acre. There is, then, no other form of fodder that can do the same thing.

(6) IT GIVES THREE TIMES MORE BEEF AND MUTTON PER ACRE THAN OUR ORDINARY ROTATION PASTURES.

The average timothy and clover pastures of the Province, in connection with mixed farming, just graze, on an average, one cattle beast to every three acres—taking from 1st May to 1st November on an average of years. This is substantially correct. But we have shown, in the preceding paragraph, that three and three-quarter cows can be kept on three acres of the permanent kind required, and as the proper stamp of two-year-old steers and heifers preparing for the butcher eat more than an ordinary milk cow, we shall say one beefing animal per acre. There are at the present time about 20,000,000 arable acres in Ontario, possessing practically no permanent pasture, but 3,500,000

acres of rotation pasture that do or should therefore maintain 1,190,000 head of, say, beefing cattle. Were only *one-tenth* of this rotation pasture under the permanent form of it, the annual gain to the Province would exceed \$11,000,000. The magnitude and national value of a few acres, per farm, of first-class permanent pasture is thus apparent.

(7) IT CAN BE USED AS A SOILING CROP ANNUALLY.

When everything is most propitious and grass abundant, and where a number of bulls and calves are housed during summer, and a reliable cut of green fodder is most important, this can always be had from well-managed permanent pasture, early and late, at the rate of ten tons per acre, green weight, where no systematic soiling crops are upheld.

(8) IT IS LESS EXPENSIVE TO PRODUCE AND MAINTAIN THAN ANY OTHER CROP.

While it cannot be maintained that there is no trouble, time, and expense incurred in establishing successfully all that we desire in this connection, nor that its permanency and value can be upheld without top-dressing materials, it is not difficult to see that once fairly afoot, permanent pasture costs a great deal less per acre per annum proportionately to produce received than any other crop can possibly do.

(9) IT IS A CONTINUAL SOURCE OF RELIANCE AND WEALTH.

Most other things may fail during a particular season, times may be bad, and disease decimate the farm, yet the permanent pasture will smile and invite a share of its wealth.

(10) IT IS PERMANENT.

The successful establishment and maintenance of permanent pasture implies :

1. A soil free of dead water.
2. A rich surface, friable but firm.
3. Depth of soil to allow roots beyond reach of drought.
4. A retentive soil to resist drought and hold moisture.
5. Securing *variety* of grasses and clovers and thick seeding.
6. Easy pasturing for first two seasons.
7. Heavy stocking, to keep down rougher plants.
8. Top-dressing at least every third year.

CHARACTERISTICS OF GRASSES NOW ESTABLISHED SUITABLE FOR PERMANENT PASTURE.

The past season has been one of the very best to test thoroughly the reliability of all pasture plants, and note their conduct in comparison with each other, particularly as regards endurance during drought, which stood very hard on 30th August, when the following observations were made :—

Red-top.—A good tough sod, about equal to Timothy, though presenting no bite.

Perennial Rye.—Looks fresher and better as pasture than Red-top and Timothy.

Meadow Fescue.—Stands drought better than Orchard or Timothy ; is now close, rich, green, and vigorous.

Italian Rye.—Not good ; few plants ; is good at re-seeding itself every season.

Kentucky Blue.—Wiry and dry with a good sward.

Timothy.—Very good, but presents no bite for cattle ; dry and somewhat withered ; takes a fourth place.

Orchard.—Somewhat behind Meadow Fescue and Fan Oat, but not much.

Fan Oat.—About equal to Meadow Fescue, which is saying a great deal.

Plot 36, Field C.

Four years' Cropping after Farm-yard Manure and three Special Fertilizers. All weights in pounds.

	1878.			1879.						1880.				1881.		Total results in quantities per acre for four years.
	Mangolds.	Turnips.	Carrots.	WHEAT.		BARLEY.		OATS.		WHEAT.		OATS.		WHEAT.		
				Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Grain.	
Farm-yard Manure	48,480	19,440	30,480	2,800	780	5,040	1,584	4,400	1,974	1,040	95	2,400	960	1,970	1,565	123,108
Mineral Superphosphate..	45,600	16,560	31,800	2,560	680	2,800	1,360	3,280	1,622	960	140	2,360	880	1,910	1,362	113,874
Nitrate of Soda	52,200	1,680	33,840	2,640	720	2,960	1,520	4,240	1,785	960	70	2,360	800	2,220	1,371	109,346
Bone Dust	34,800	1,920	32,430	2,560	720	3,040	1,280	3,840	1,300	560	20	2,040	800	2,390	1,331	89,061

4.—INDIAN CORN.

Six kinds received from S. White, Esq., of Charing Cross, Ontario, all without names except one, the others being numbered, produced under the ordinary mode of cultivation, as follows, per acre:—

	GRAIN, IN BUSHEL8.	STALKS, IN TONS.
No. 1.....	43	5½
No. 2.....	34	4½
No. 3.....	18	3½
No. 4.....	18	2¾
No. 5.....	46	5½
Crompton's Early.....	30	2½

5.—POTATOES.

CROP 1881, IN ORDER OF QUANTITY PER ACRE.

VARIETY.	Bushels per Acre.	Remarks.
Peerless.....	191	Large; no smalls.
Success.....	182	Medium size.
Late Rose.....	176	“ “
St. Lawrence.....	174	All small-sized.
Eureka.....	173	Fair.
Perfection.....	171	Small.
Early Ohio.....	169	Medium.
Extra Early Vermont.....	169	Very small tubers.
Brownell's Superior.....	150	Small and poor.
Beauty of Hebron.....	147	Very small.
Snowflake.....	144	Small; few large ones.
Compton's Surprise.....	142	Very small.
Brownell's Vermont Beauty.....	134	Medium in size.
Average.....	163	Bushels per acre.

6.—FARM-YARD MANURE AND SPECIAL FERTILIZERS ON MANGOLDS, SUGAR-BEET AND CARROTS

	Farm-Yard Manure.	Guelph Superphosphate.	Marcon's Superphosphate.
White Sugar Beet	1,412	960	1,128
Orange Globe Mangold	966	1,045	1,402
White Belgian Carrot	347	233	282
Mean	908	746	937

7.—THE GROWING OF LARGE ROOTS IN A DRY SEASON (1881).

VARIETY.	Average Weight of each Bulb.	Bushels per Acre.
	lbs.	
White Silician Sugar-Beet	7.7	1,167
Fisher Hobbs' Orange Globe Mangold	7.4	1,124
Yellow Globe Mangold	7.1	1,083
Norbiton Giant Long Red Mangold	6.7	1,029
Large White Sugar-Beet	6.2	936
Carter's Warden Prize Mangold	5.4	916
Manmoth Long Red Mangold	5.0	739
Red Globe Mangold	4.7	689
Kilmorin's Sugar-Beet	4.0	658
Scottish Champion Swede	4.0	615
Mean	5.8	896

8.—CONTINUOUS CROPS OF CEREALS AFTER CLOVER, AND FALLOWING, SEPARATELY.

The object here is to follow up the effects of (A) a preparation of two years' growth of clover (Lucerne), and (B) of a bare fallowing heavily dressed with farm-yard manure—in preparation for continuous crops of cereals. The facts for two years are already in our hands, and I have much pleasure in submitting the following abstract thereof:

PREPARATION.	1880.		1881.		TOTAL RESULTS THUS FAR.	
	OATS.		OATS.			
	Grain.	Straw.	Grain.	Straw.	Grain.	Straw.
	B. lbs.	lbs.	B. lbs.	lbs.	B. lbs.	lbs.
Clover.....	38.10	4,020	50.00	2,210	88.10	6,230
Fallowing	29.24	3,210	33.18	2,060	63.6	5,270

Before commenting upon this, it is of importance to observe that the Province is considerably interested in the question of fallowing or no fallowing, and also of the value of clover as a preparation for other crops. There are those who maintain that advanced farming cannot possibly recognize the want of one crop out of seven or eight, as either sound in principle or at all required by the necessities of any particular circumstances—that having to give a year's rest, or cleaning, or whatever it may be called, is evidence of want of ability, if not of ignorance. They show that under a proper system of rotation, having as its base a thoroughly managed root division, there cannot possibly exist any necessity for allowing one year to go without a crop, which simply means a loss. On the other hand, there are those who contend that summer or bare fallowing is indispensable to the best success in very many cases, particularly on soils of a heavy character, where cleaning and atmospheric influences do more than root cultivation. They argue that it is natural to allow a rest, and altogether there is such a gathering up of good things as more than compensates for the want of a crop throughout a rotation course. Apart from these practices, some others advise that all virtue, permanency and the greater wants of all vegetable life can alone be had from the growth of clover and its application as a direct manure. They point to chemical facts and experience in confirmation, and say they avoid the extremes of no crop and of expensive production of exhaustive roots.

So, then, we take up meantime the question of Clover *versus* Fallowing. The plot is a clay loam of medium physical character, which was neither rich nor poor by previous cropping or manuring; it is very uniform both as regards soil, aspect and management before 1880. In 1878 one-half (A) was spring seeded broadcast with Lucerne, which then, and during 1879, gave fair crops for soiling—roots being traced as deep as two feet. The other half (B) was bare fallowed in 1878 by being repeatedly ploughed during summer, and receiving 20 loads per acre of farm-yard manure covered under with the last ploughing in the fall; in 1879 turnips were sown, but proved a failure—very few plants came, but cultivation was carried out, and thus practically, therefore, it had another year's fallowing.

The foregoing abstract of the two first years' cropping of oats after these preparations shows a most decided result in favour of clover—a result of such a sledge-hammer character as must place clover men in the big chair for some time to come. During the first season clover gave thirty per cent. more grain and twenty-six per cent. more straw, and the second year no less than fifty-two per cent. more grain, though only seven and one half per cent. more straw. Financially, for the two years, we have from—

Clover preparation	\$23.60	per acre per annum.
Fallowing	16.60	“ “

A difference of no less than two rents per annum in favour of clover, without reference to any items, more or less, on either side, in regard to cost of such preparations. What has the farm-yard manure been doing, and where are the gathered virtues from rest and

atmosphere? Is there more in the Lucerne form of clover than in our ordinary Red variety, or does the value lie as much in their being agents in tapping subsoil fertility as well as direct manures? Meantime we must bow to the clover men.

9.—HAY FROM NINETEEN FORMS OF FERTILIZERS, AS APPLIED IN 1879.

MANURES.

Lbs. of Hay
per Acre.

Bone Dust and Salt	4,000
Farm-yard Manure	3,440
Bone Dust	3,400
Bone Superphosphate	3,280
Mineral Superphosphate	3,200
Mineral Superphosphate and Gypsum	3,080
Gypsum	3,040
Lime	2,720
* Bone Superphosphate and Salt	2,680
Bone Superphosphate and Bone Dust	2,480
Mixture of all	2,480
<i>Unmanured</i>	2,320
Salt	2,080
Mineral Superphosphate and Bone Dust	2,000
Bone Superphosphate and Gypsum	2,000
Mineral Superphosphate and Salt	1,880
Bone Superphosphate and Mineral Superphosphate	1,840
Gypsum and Salt	1,680
Bone Dust and Gypsum	1,670
Nitrate of Soda	1,040
Average	2,515

This is upon part of farm field No. 9, that is under regular rotation. In 1879 the crop was turnips and spring wheat, seeded with grasses and clover in 1880—hence the hay of this year. The manures applied to roots in 1879 were 500 lbs. per acre each when alone, and 250 lbs. when associated; farm-yard manure 20 tons, and lime 3 tons per acre.

The produce of hay was affected by four things: weather, irregularity of surface, kinds of grasses, and clovers that predominated in each plot, and by the fertilizers. Now, there is really more than is at first sight apparent in the influence of weight of crop here by the kinds of plants. We sowed—Timothy 4, Orchard 2, Red Top 2, Red Clover 6, Alsike 3, and White Clover 3 lbs. per acre. Whether owing more to manure influence, or to irregularity of surface, or to weather, it is difficult to say; but there were seven distinct classes of hay crops where one or more of the grasses or clovers predominated,

and thus unquestionably affected the yield by weight. While, therefore, to some extent unreliable, it is very interesting to note the great range of produce from bone dust and salt down to nitrate of soda—from two tons to one-half ton per acre. Using the unmanured as a dividing line, it is impossible to assign the exact reasons why most of the *associated* fertilizers should be below, and most of those acting alone are above this datum.

10.—SUNDRY SMALL EXPERIMENTS.

1. The French poppy matures and bears full seed here. Seed got from Ontario Immigration Agent, Havre, France.

2. The Soja beans obtained from Mr. Bruce, of Hamilton, have done well, half crops producing fifteen bushels per acre. A low-branched bush one foot high, some individual plants had 125 pods, with two and three in each pod.

3. Fertilizers applied to roots at different stages of growth, for the first time this year, have given such a varied result, that a detail report is held over until 1882, when further experiment will make more interesting and reliable.

4. As usual, we grew about 200 varieties of wheat, oats and barley for purposes of comparison, class room instruction, and for the making of sample books for distribution.

5. The heaviest crop of sugar beet or mangold this year was from seed of our own maturing and preparation. White Silician variety of beet.

6. In field No. 8, where apatite was used against farm-yard manure in 1879, the crop of turnips this year was slightly the best from apatite.

7. Again, the sugar cane matured at our high elevation (900 feet above Lake Ontario: 1,120 feet above sea). The Chinese variety is much the earliest, the Early Amber being later.

11.—EXPERIMENTAL NOTICES.

1. We have 42 different kinds and associations of grasses and clovers by this year's seeding in preparation for further evidence regarding suitability for the Province.

2. We are continuing the test of over 100 varieties of wheat, oats and barley, part evidence of which appeared in 1879 and 1880 Reports.

3. The very important experiment of the feeding of cattle with peas, oats and corn is being continued, with nine yearling steers and heifers in three batches, each batch receiving a change of food every two months.

4. We have in view for winter 1882-3, to place against each other in feeding, the first cross of Shorthorn upon Canadian cow; Aberdeen Poll upon Canadian cow; Shorthorn upon pure bred Ayrshire cow; and Hereford upon Canadian cow.

5. We have on hand, in preparation for next year's fall shows, twelve stamps of mutton and wool, by shearling wethers and ewes.

V.—THE GARDEN.

Our Horticultural work in all its branches was never so full nor so well overtaken as during the past season. Mr. Forsyth's management is unassuming, yet reliable and thorough. The Committee of the Fruit Growers' Association will report to you in regard to fruit and forest tree cultivation here, so that all I need submit at present is the Gardener's report to me on the general work of the year. Following the recent appointment of a Professor of Botany and Horticulture to our College, we look forward with great pleasure to increased interest in this department, and to the more intimate association of its science and practice.

Mr. Brown:—*Sir*,—In briefly reporting to you on the Horticultural work of the past year, I would say that notwithstanding many reverses, arising principally from causes beyond our control, the results as a whole have been encouraging and quite equal to expectation. The unusual severity of the winter (1880-81), extending over the length and breadth of the Province, left its traces on all tender and untried varieties of

fruit trees and shrubs, even killing many that had hitherto stood the test of years and thought to be well established.

The young trees planted here, on the laying out of the Kitchen Garden five or six years ago, have suffered much from the above causes. Forty-four pear, six plum and seven cherry trees were found to be worthless, and had to be consigned to the rubbish pile—although up to this a more healthy, vigorous and promising lot of young trees, just coming into fruit, could seldom be met with. The smaller fruits suffered less: Gooseberries and Currants had their usual attack of caterpillar, but those being kept under, they did as well as usual. The more persistent attack of mildew on the English varieties of Gooseberries is less easily overcome, and I fear will continue to be a drawback to their more extensive cultivation. Grape-vines were vigorous and the fruit abundant. The season may be said to have been exceptionally favourable for the vineyard: having escaped the late spring and early fall frosts, with the unusual drought of August and September, did much to mature doubtful varieties and improve all. Lindley, Delaware, Concord, Rogers' Nos. 4, 19, 33 and 44, with some others, produced largely and ripened well. Adirondac, Iona, and Salem were slightly affected by mildew, but all bore heavily, and the general result was most satisfactory.

The Apple crop, like that generally throughout the Province, was limited in quantity, and the quality of fruit hardly up to the average sample. All through the month of May and first half of June the nights were cool, and vegetation backward: consequently early vegetables were for the time scarce, but after this all culinary vegetables were very plentiful. Many of the staple sorts—Potatoes, Cabbage, Carrots, Beets, Parsnips, Peas, Beans, etc.—were specially abundant in their season—Tomatoes producing at the rate of 500 bushels to the acre.

On account of the long-continued drought and scarcity of water, which had to be obtained in limited quantities from various sources at the cost of much time and labour, the Flower Garden, I regret to say, had not at any time during the summer that fresh and luxuriant appearance which might have been expected, from the increased number as well as the many additional species and varieties of bedding plants which we had taken some interest in collecting. Yet under these adverse conditions they kept growing and blooming, so that when compared with others elsewhere they were pronounced by many to be wonderfully fine.

From the amount of extra labour in this department throughout the season, and especially in the spring months, in laying out and planting nearly twenty acres of a new Orchard, including Apples, Pears, Plums, Cherries, Gooseberries, Currants, Raspberries and Strawberries, as well as nearly two acres of Grape-vines, and an arboretum composed of over 300 different species and varieties of trees and shrubs, under the supervision and direction of the Fruit Growers' Association, and which will no doubt be reported on elsewhere, you are aware that not a great deal could be accomplished in the way of new work or permanent improvements; yet this has by no means been overlooked when time and opportunity permitted. During the summer the dilapidated wooden verges of the Kitchen Garden, which from the first were of a temporary character, and in their decayed state have been an eyesore for years, have been removed and substituted by what we consider a more permanent and less expensive article, namely, small boulders, or the larger-sized pebbles collected from the field, costing only the labour of drawing and laying them, and which now present a neat and rather unique though somewhat rural appearance. Other minor alterations have also been made, and some gravel thrown on to the walks and drives, but in this there is yet much to be done.

Some few additions have been made to our stock of Greenhouse plants, and all continue increasing, and are as healthy as can be; still the list is very limited and incomplete compared with what might reasonably be desired, consisting as they do principally of soft-wooded plants, no money having ever been spent for this purpose; but it may truly be said that we have all in number and perhaps in value that the space will accommodate. The houses and workshops connected therewith, as you well know, are in a very inconvenient and unsatisfactory condition. Constructed from the first on a very primitive and contracted plan, especially the system of heating (by flues),

which is very imperfect and defective—even dangerous, requiring the greatest care to avoid the very probable possibility of fire. Indeed the whole structure (workshop included) is not equal to what we see in the possession of many unpretending florists or market-gardeners throughout the country. I may here express a hope that you will use your influence to have the proposed new Greenhouses erected the coming season; and in this event I would suggest that one of the smaller houses should be so constructed in the internal arrangements that it would be suitable for forcing such as Lettuce, Radish, Rhubarb, etc., and thus supply a very pressing and growing demand of the Boarding-house during the spring months, when vegetables are scarce and can hardly be produced in sufficient quantity by any ordinary amount of hot-bed frames.

As you are aware, during the winter months, when outdoor work was impracticable and students' labour could not be so profitably employed, about two hours each day were spent on practical instruction in the Greenhouses.

The various ways of root and top grafting were explained and practised by the students; also, the mode of propagating greenhouse and other plants; the watering, temperature and moisture required; the different systems of heating, and the potting, growing, hybridizing, and selection of plants generally; the composition of desirable soils for potting purposes; the insect pests that usually attack inside plants, with the means of getting and keeping clear of them; also the common and technical names of the plants we have, with the natural orders to which they belong. In all this the students generally manifested considerable interest, and, indeed, passed a very creditable examination at the close of the session; and not a few have so expressed themselves as looking upon these exercises of more real value to the practical man than the more tedious study of systematic Botany or Vegetable Physiology. It seems surprising how little the majority of intelligent young men know of the Pot culture and management of plants. In this I believe that many could profitably take lessons from their elder or younger sisters. It is perhaps to be regretted that these practical lessons cannot be carried out to a greater extent into the Kitchen and Flower Gardens, the Orchard, the Vineyard, and Arboretum. This, however, cannot be done during the spring and summer months, unless more skilled labour is employed. One of the principal difficulties to be contended with in this department is to get the amount of work accomplished by student labour, with advantage to them and justice to what is required of them—that is, to get the work accomplished in a satisfactory and workman-like style; and with a growing demand for skilled labour, this want is greatly on the increase.

VI.—THE MECHANICAL.

Mr. McIntosh has taken us through a year of unusual activity—in what and how much, his letter to me gives a good idea. I am still dissatisfied that this department remains unacknowledged as technically educational. Of course we are much pleased with what it does for all the others practically, but so many students desire to devote part of their time with us, to the higher lines of mechanics, that unless the foreman's hands are strengthened by systematic help throughout, the most of them leave incomplete even in what pertains to farm work alone. I do not think that anything should be attempted beyond what attaches properly to an Agricultural College, but in this *everything* should be thoroughly well done—time given, and the necessary help given to do it. The foreman should have more leisure to superintend, to advise, to instruct, to describe, to use the blackboard, and should not be tied, as he necessarily is at present, to working with his own hands, running from place to place, and sharpening tools.

Mr. Brown:—*Sir*,—In accordance with our usual custom of giving a summary of operations that have engaged our attention in connection with the Mechanical Department for the last twelve months, I find, by referring to the time book, that after the routine of examining the new students, the machinery attaching the engine to drive the root and straw cutters and chopping mill were overhauled and put in trim by the addition of a counter shaft and pulleys, belts, etc. We have obtained a decided advantage over the former way. While this was going on, another part of the students were engaged at repairs about the college, and putting on the winter windows and fitting and glazing new ones for addition

to the buildings. Considerable repairs were also done to the dwelling houses of the farm hands, and all necessary repairs about the farm buildings. Prominent in this line was the fitting up of the instruction stable with iron stalls, feed boxes, hay racks, etc., the walls were likewise lined with tongued and grooved stuff, and now it is a well-finished and comfortable stable.

The want of a proper place to store away the farm implements, when not in use, had long been felt: the erecting of such a house or shed had been kept in view for some time. About the 1st of January it was decided to prepare for such a building by providing timber for the frame-work from the farm bush, and allowing the students to do this and have it ready for raising. We were in a position to put together by the time the frost was out of the ground; the building is 100 feet long by 27 feet wide, one storey divided into eleven compartments, giving ample room for the implements now on hand. The garden department must not be overlooked, as it brings considerable work to the mechanical in the way of repairing implements, tools, glass, hot beds, etc. Perhaps it will give the best idea if I submit one day's proceedings in the distribution of students and their various employments during forenoon and afternoon, and as I have the journal open at page 144, Feb. 23rd, 1881:

STUDENTS' NAMES.	EMPLOYMENT.	HOURS.
A.M.		
Grant	Repairing stable door	4½
Tronson	“ “	“
Dewar	Getting out timber in bush, for implement house	“
George	“ “	“
W. McIlquham	Hewing timber, for implement house	“
McLaren	“ “	“
McCauley	Making whiffletrees	“
Hill	Repairing locks for stable doors	“
Shaver	Clerk	“
Wyndham	Agent, taking orders from other departments	“
P.M.		
Ballantyne	Repairing hay-rack	3½
W. Phin	Filing saws	“
Chipman	Clerk	“
Surtees	Framing timber for implement house	“
Nicol	“ “	“
Clutton	“ “	“
J. McIlquham	“ “	“

About the 1st of March we got some shafting, pulleys, etc., in order to have a circular saw rig in the shop to be driven by the engine, at a cost of about \$150. In this we have also an edging table, with 24-inch circular saw and one for small saws; with these we not only do the work quicker, but as a point of education they are a success, and in this connection there are some things required for the department, viz., a turning lathe at say from \$60 to \$80, and a surface planing machine at \$200, all to be drawn by the engine.

During the same month all the farm implements were examined and the necessary repairs completed ready for spring operations.

April 5th.—Commenced erection of tool house; this building is 84 feet x 26, frame, with brick foundation, lean-to roof, one part 20x26 feet used for farm foreman's office, the remaining 64x26 feet, required for storing farm tools, such as forks, spades, hoes, rakes, scythes, etc. There were now sixteen students given to this department at each distribution and to find employment for that number we began to erect the implement house at the same time as this building, and to a large extent they were under the control and direction of the more advanced students. Both these buildings are nearly

complete; the exception being some doors, shelving, etc., which are now being attended to.

About the 1st of May you handed me a plan for shed and airing-yards for bulls; this building, 40 feet 6 inches x 55 feet, 13 feet 4 inches in height to plate, is likewise frame, having six loose stalls 14x14 feet, with airing yards for each 14x20 feet, and compartments for straw, roots, and grain, all on the ground floor, and a large granary overhead. This building stands upon 58 cedar posts sunk 4 feet into the ground; commenced to build 1st day of June, but owing to some delay in getting material forward, it was not pushed on until near the end of the month, and completed so far as to receive the animals by the 1st of August,—students doing the greater part of the work.

In the matter of field-fences we did not accomplish quite all that was intended; there was, however, about 20 rods of board fence run along what is known as the south lane, enclosing one side of fields 2 and 3, and about as much of wire fence enclosing one side of fields 17 and 18, with all repairs of existing fences, shifting gates to more convenient places in fields, also making and putting on new ones where required.

With regard to instruction, I have not been able to give explanations so thoroughly as desirable, and this is partly owing to the intricate nature of the work, the want of experience on the part of a great number of the students, and the limited time they are in the department. I feel it to be my duty to suggest through you to the Government that there be an assistant in this department, and that each student be taught not only the use of tools and how to apply them properly, but also be able for himself to put them in proper order.

VII.—THE ONTARIO EXPERIMENTAL FARM BALANCE SHEET, YEAR 1881.

REVENUE.		\$	cts.	\$	cts.	EXPENDITURE.		\$	cts.	cts.
Grain sold		584	85			FARM.				
Wool sold		238	35							
Animal service fees		248	50							
Live stock sold		4,536	15							
Miscellaneous receipts		7	75							
Gross cash receipts.....		5,615	60			Labour paid for, including ploughmen, instructors, harvest help, public sale, etc.....		3,533	63	
Allowance for keep of ten cows for College use		350	00			Manures other than farm-yard.....		275	86	
Keep of six cows for farm hands (now withdrawn)		210	00			Seed bought		292	95	
Keep of Garden, College and Superintendent's horses		305	00			Live stock bought—horses, cows, sheep, pigs		326	50	
Half cost of keep of two instruction teams.....		100	00			Feed purchased this year during fall being cheaper, in place of doing so in spring and summer of 1882—principally oats, bran, middlings, and peas		749	62	
Allowance for maintenance of three breeds of cattle (Ayrshire, Galloway and Devon), nine head, as educational—less value received from sales thereof		195	00			Repairs and alterations on buildings, machinery, implements		2,202	55	
Allowance for maintenance of three breeds of sheep (Merino, part Cotswold and part Leicester) as educational—less value received from produce thereof		55	00			Medicines to live stock		1,204	45	
Keep of one breed of swine, as educational—less value received from produce thereof		25	00			Printing and advertising		68	25	
Horse labour supplied to Experimental Department		180	00			Public sale expenses, other than regular labour		130	95	
“ “ College.....		45	00			Rents of houses for Farm and Garden Foremen		190	19	
“ “ permanent improvements.....		75	00			Permanent improvements—buildings, machinery, etc.....		208	00	
Wages of extra farm hand to assist in superintending student labour during summer		180	00			Unenumerated		100	00	
Wages of Instructor on Farm Practice		396	00			Gross Farm expenditure		287	37	9,630 32
Manure supplied to Garden		65	00			GARDEN.				
“ “ Experimental Department		103	00							
Loss of crop from land occupied by Experimental Department, new orchard and tree clumps		110	00							
Extra labour in maintaining “appearance” over Farm, half time of one man		180	00							
Labour on tree clumps and shelter-belts		85	00							
Value of farm produce (potatoes, wheat, etc.) supplied to College		560	00			Labour, including Fruit Grower's man		1,064	40	
Carpenter work (College), permanent improvements, etc.		90	00			Seeds		46	25	
Fuel supplied to College.....		90	00			Implements		118	40	
“ “ farm hands (now withdrawn)		210	00			Repairs		60	71	
Extra expenditure in purchase of implements, and repair of same		185	00			Unenumerated		31	64	
						Gross Garden expenditure				1,321 40
						Grand total cash expenditure				10,951 72
						Students' labour in Farm, Garden, and Carpenter Departments for twelve months				5,130 68

Extra expenditure in harness, horse-shoeing, etc.	95 00
Rents paid for Farm and Garden Foremen	208 00
Labour in making roads—thirty days of three teams, with four extra men.	390 00
Garden produce supplied to College	350 00
One man attending to Fruit Grower's work, pleasure grounds, &c.	324 00
Farm produce on hand 1st November, 1881—	10,776 60
Wheat	189 00
Oats	360 00
Barley	145 00
Pears	75 00
Turnips	640 00
Mangolds	400 00
Carrots	30 00
Hay and straw	700 00
Increase to live stock by own produce, on hand—	
Cattle	\$825 00
Sheep	845 00
Manure on hand, 60 tons	1,470 00
	120 00
Total Revenue	4,189 00
	14,965 60

VIII.—CONCLUDING REMARKS.

Seven years' work of the Ontario Agricultural College and Experimental Farm are now finished. The experience gained by the Government and their officers in regard to the value of such an institution must be almost full. If not nearly full, then weakness exists somewhere—where, it should be the duty of the public to enquire. But, as Ontario records already tell, our success in securing home patronage and the world's patronage during this comparatively short period has been quite a feature in school history—for we are essentially a school, and the unusualness of this bids me draw your attention to some points that may ere long tend to mar this comfortable popularity. I am not one whit apprehensive of evil, but rather jealous of the status already attained, and of the value of its being made more permanent.

I must preface by stating that too much is expected of us—entirely too much. I do not refer to those ignorant of the modern idea of scientific and practical farming, because their opinion is not worth anything; but to the expectations of the over-anxious father and of the un-self-reliant student. This is no doubt a weak point in more lines of life than ours, yet it has been more ours of late than older institutions, by reason of our short life. With very many of the young men who have come through our hands during these seven years, the expectation has been that they came to gather, without the necessity of much effort on their part, that they could be made farmers in two years, as against the life experience of the past generation. That this is purely ridiculous we need not delay to inquire, but it must be held up to the country that no possible amount or value of instruction on our part will ever make the farmer unless he is himself in love with it. Let it be clearly understood that the two years with us means only an introduction to such a measure of principles, science, and practice as but whets the appetite for more, and that we are as unable to fledge a young man for this profession as the Toronto University is in turning out a lawyer, a doctor, or a clergyman.

We have it in our experience that no volume of brain activity and practice is able to farm unless accompanied by that measure of madness called enthusiasm. Those thus constituted have always done well here—thankful of the advantages, never complaining of want of appliances—and altogether stand out in strong relief to others whose minds may be above clods and cattle. We have never yet had an example of keenness accompanied with dissatisfaction. And now for a weakness or two:

I should like to see more opportunities in the hands of the Professor of Agriculture, whereby with his classes he should visit such works and objects on the Farm in their monthly and weekly progress as may be required to supplement, verify, and inpress lectures, as well as being separately and immediately practical in their aim. Many important things are necessarily missed by a certain number of the students, who, while at study, cannot be with those others who are finishing a certain job on a certain day; and all the explanatory talk by the teacher in the class-room cannot possibly make up for the same thing *on the spot*. In the same way the Professor of Botany and Horticulture should have an open card for the many important references in the kitchen, flower, and fruit gardens, as well as the arboretum. Even the Chemist should go a-field occasionally; and why not the Entomologist? As being more immediately interesting to myself, I beg that the Veterinary Professor be also permitted to take his classes out whenever he deems it desirable. I consider "class-room-out-door" lessons of the highest value.

But the most prominent weakness in my departments is one that I have more than once adverted to in previous Reports—the being unable to give *repeated* lessons to every student in every practical detail of the Farm. The Government has met us very liberally in regard to part of this by allowing an extra team of horses for the use of Second-year Students, and more they cannot be asked to do until some practicable and thorough scheme is matured. Ploughing and management of reapers and mowers come more closely under this list, for in most other things we do a great deal.

Indeed, in place of crying "More—more," we ought to refrain by calling "Less—much less." We cannot blink the fact that education is being pressed too hard here; the

students do not say much about this, because the admission might be a reflection upon their capacity, though it would be only so in appearance. No young man, or old either, is able to do well to himself and others by attempting in two years all that is offered by our curriculum. That some have taken every year First Class Honours is no conclusive evidence whatever of well-appropriated materials. The best evidence to us is the inability of the average student to acquit himself to his own satisfaction, and it is the average man who should guide.

Along with these critical remarks, I think it is also mine officially to say something on our progress, though undoubtedly well done in another form in this issue. President Mills has taken us through a year of unusual activity in the College and lecture-rooms. There are not half-a-dozen men in the Province able by experience or by intuition to weigh what it is to have the care, in all its variety, domestically, morally, and educationally, hour by hour daily for months in succession, of one hundred and thirty young men, in one house, one-half of whom are neither boys nor men; it is a position few are able to fill, and few need covet. The fact then of so few troubles having occurred during this our first year of a roll of over six score speaks much for the President and for the students.

I could make you up another report, nearly as lengthy as this one, of communications from ex-students, now in many parts of the world, telling their experiences—failures and successes—but all delighted to hear from the "O. A. C.," and expressing warm gratitude for their connection with it. Indeed, the present year is one marked by the return of three or four of these, of the most practical stamp, who, after leaving us, and having to fight life's battle in a new form, found out where they were weak, and had the manliness to acknowledge and to renew their connection. I consider this one of the highest compliments the Institution has received. Another phase of our growth requires careful handling; that is, recommending students as managers of farms. My correspondence in this regard is steadily increasing, especially from the United States; and so sure as beef and mutton production is on the increase in all parts of the American continent, so sure will the demand increase for first-class managers of live-stock. We filled two such applications during the past year.

In my long connection here I have never expressed an opinion regarding the future of the "Farmers' College." Let me respectfully do so now. The maintenance of a new thing like ours, in the view of some people, requires disconnection with politics, endowment, and affiliation with an University. I see no practical necessity for either of them. It is enough for us that the Institution has steadily made progress, and has never gone back. I have known no serious political jarrings over us, and what have been have been for our good. Comparative independence by endowment would likely mean less progress by reason of less life. We all need stirring up by people, press, and Parliament, and any proposed association with an University could not make us better farmers nor better men. In one word, so long as our halls are well filled, no one has a right to grumble; there are no better critics than the students themselves, and with this always keen, and your own open and firm supervision, the country may say, "Let well alone."

In conclusion, permit me to acknowledge the obligations I feel to all the officers, men, and students, for help and kindness under many forms, through many difficulties, thus made lighter and easier surmounted by such agreeable union.

I have the honour to be, Sir,

Your obedient servant,

W. BROWN,

Professor of Agriculture and Farm Superintendent.

APPENDIX.

INVENTORY AND VALUATION OF OUTSIDE DEPARTMENTS.

FARM—LIVE STOCK.

HORSES.

14 Working horses	\$1,940 00	
		\$1,940 00

CATTLE.

Herefords:

1 One-year-old bull	400 00	
3 Cows	900 00	
		1,300 00

Shorthorns:

1 One-year-old bull	800 00	
1 Heifer	1,450 00	
5 Cows	850 00	
2 Heifers	300 00	
		3,400 00

Devons:

1 Three-year-old bull	160 00	
1 Cow	100 00	
1 Heifer	70 00	
		330 00

Aberdeen Polls:

1 One-year-old bull	400 00	
1 Heifer (imported)	400 00	
2 Cows	400 00	
1 Heifer	350 00	
		1,550 00

Ayrshires:

1 Two-year-old bull	250 00	
4 Cows	400 00	
1 Heifer	100 00	
1 Calf	25 00	
		775 00

Jerseys:

1 Two-year-old heifer	300 00	
		300 00

Grades:

13 Cows	520 00	
3 Heifers	90 00	
		610 00

Fattening Stock:

11 Steers and heifers	536 00	
		536 00

SHEEP.

Cotswolds :

2 Shearling rams	\$250 00	
32 Breeding ewes	960 00	
5 Ram lambs	125 00	
13 Ewe lambs	260 00	
	<hr/>	\$1,595 00

Leicesters :

1 Shearling ram	100 00	
13 Breeding ewes	390 00	
2 Breeding ewes	100 00	
1 Ram lamb	25 00	
1 Ewe lamb	20 00	
	<hr/>	635 00

Oxford Downs :

1 Shearling ram	150 00	
10 Breeding ewes	500 00	
1 Ram lamb	35 00	
2 Ewe lambs	40 00	
	<hr/>	725 00

South Downs :

1 Ram (aged)	40 00	
1 Shearling ram	200 00	
23 Breeding ewes	690 00	
1 Ram lamb	30 00	
2 Ewe lambs	40 00	
	<hr/>	1,000 00

Shropshire Downs :

1 Three-shear ram	150 00	
1 Shearling ram	150 00	
8 Breeding ewes	400 00	
4 Ewe lambs	120 00	
	<hr/>	820 00

Merino :

1 Three-shear ram	100 00	
	<hr/>	100 00

Grades :

15 Breeding ewes	105 00	
	<hr/>	105 00

Feeding Wethers, Grades :

26 Feeding wethers	150 00	
	<hr/>	150 00

PIGS.

Berkshires :

1 Imported boar	90 00	
3 Sows	120 00	
2 Small boars	30 00	
1 Small sow	10 00	
	<hr/>	250 00

Prince Albert, Windsor :

2 Brood sows	90 00	
	<hr/>	90 00

Feeding Pigs :

Thirty-four	115 00	
	<hr/>	115 00

Essex:

1 Boar	\$30 00	\$30 00
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Poland China:

1 Boar	25 00	25 00
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Dogs.

Scotch collies	50 00	50 00
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Total for Live Stock..... \$16,562 00

FARM DEPARTMENT.

1 Vertical 6 horse-power boiler.....	189 00	
1 Portable steam engine.....	725 00	
1 Vibrator	445 00	
2 Feed boilers	25 00	
5 Farm waggons	200 00	
1 Democrat	20 00	
2 Carts.....	45 00	
10 Sets of double-trees	19 00	
5 Neck-yokes	5 00	
3 Pair of bob-sleighs	65 00	
1 Long sleigh	15 00	
1 Pleasure sleigh	30 00	
3 Seed drills.....	130 00	
2 Reapers	120 00	
2 Mowers.....	110 00	
2 Pea-harvesters	36 00	
2 Horse rakes.....	60 00	
2 Cultivators	30 00	
1 Jack	12 00	
1 Drag sawing machine	50 00	
3 Fanning mills	65 00	
1 Circular saw.....	30 00	
		2,426 00
Wheel-barrows, combs, brushes, oil cans, wrenches, saws, hammers	20 00	
Axes.....	50 00	
1 Horse-power.....	35 00	
1 Separator	70 00	
4 Iron ploughs.....	65 00	
6 Metal beam ploughs.....	100 00	
1 Wooden beam plough	8 00	
1 Double mould-board plough	28 00	
2 Gang ploughs	35 00	
1 Sub-soil plough	20 00	
6 Ploughs, with wheel and skimmer.....	70 00	
1 Turnip drill	10 00	
5 Set iron harrows	75 00	
		586 00
2 Sets of wooden harrows	10 00	
1 Wooden roller	25 00	
Shovels, spades, forks, hoes, and draining tools		
Scythes, cradles, reaping-hooks, rakes, barley-forks, etc	100 00	
1 Stone-boat	5 00	

6 Sets team harness	\$130 00	
7 Sets plough harness.....	60 00	
2 Sets cart harness.....	18 00	
1 Barn truck	4 00	
2 Weigh scales	35 00	
1 Platform scale	90 00	
		<u>8477 00</u>
Measures, horse-blankets, bags, chains, picks and baskets....	75 00	
5 Hay racks	35 00	
1 Water cart	60 00	
1 Straw-cutter and belts.....	35 00	
2 Grain crushers	75 00	
1 Cake crusher	20 00	
4 Root pulpers and slicers.....	120 00	
90 Cattle chains	86 00	
1 Bull leader	1 00	
Sheep racks and troughs.....	75 00	
2 Cross cut saws	6 00	
1 Desk in office	8 00	
1 Medicine chest and medicine	20 00	
10 Stable lamps.....	8 00	
5 Gravel boxes	10 00	
1 Stove.....	10 00	
1 Spring tooth harrow	16 00	
1 Road scraper	10 00	
4 Horse hoes	40 00	
1 Blacksmith's forge and tools	80 00	
Tarpaulin, waggon dks. and ox yoke.....	24 00	
		<u>764 00</u>
Total for Farm.....		<u>\$3,853 00</u>

GARDEN.

2,500 Flower pots	75 00
500 Greenhouse plants	450 00
3,000 Mixed bedding plants.....	250 00
6 Watering cans.....	7 50
1 Syringe and set of roses.....	5 00
8 Hot-bed frames and sashes.....	45 00
4 Hand glasses.....	4 00
100 Seed boxes	7 50
1 Cart horse.....	100 00
1 Set cart harness	8 00
1 Single sleigh.....	30 00
1 Set single harness	12 00
2 Ploughs and double-trees	23 00
1 Set harrows and cultivators	14 00
1 Garden roller	8 00
1 Metal horse roller	40 00
2 Wheel-barrows and 1 hand-barrow	6 00
1 Gravel screen and 5 hand-screens	15 00
5 Garden rakes	4 00
15 Garden spades	20 00
7 Shovels.....	10 00
15 Draw hoes.....	7 00
6 Dutch hoes	3 50

6 Snow shovels and 1 snow plough	\$6 00
4 Scythes and snaiths	5 00
3 Planting trowels and 3 spades	3 50
5 Pruning saws and 1 buck-saw	7 50
3 Manure forks	2 00
8 Potato forks	6 00
2 Garden lines and reels	3 00
2 Tree scrapers	1 00
4 Hammers	3 00
2 Pair edging shears	4 00
2 Pair hedge shears	4 00
2 Pair pruning shears	4 50
1 Pair vine pruning shears	3 00
2 Edging knives	2 00
9 Pruning knives	6 00
6 Grafting knives	2 00
2 Picks and 1 crowbar	3 00
2 Axes and 1 set iron wedges	4 50
1 Seed drill and 3 potato dusters	9 00
1 Framing square, compass and knives	4 00
1 Hedge bill and hand axe	1 50
6 Baskets and 2 brooms	1 50
18 Bass mats and 2 hay rakes	9 50
3 Wire baskets and 3 thermometers	3 00
10 Branding irons	8 00
1 Monkey-wrench	1 50
1 Waggon jack	2 00
1 Stable lantern and 2 oil cans	2 00
1 Step ladder	1 00
16 Hyacinth glasses	4 00
2 Sickles and 3 garden markers	2 00
2 Lawn mowers	20 00
150 Zinc tree-labels	60 00
1 Stove	1 00
1 Office desk	1 50
6 Rustic chairs	4 00
1 Tape line and sundries	5 00
<hr/>	
Total for Garden ..	\$1,354 00

CARPENTER SHOP.

12 Hand cross-cut saws	16 00
4 Hand rip saws	7 00
1 Compass	1 00
4 Draw-knives	4 00
4 B. Braces	10 00
1 Set auger bits	10 00
1 B. Machine	6 00
20 Gimlet bits	2 50
5 Oil-stones	3 75
6 L. Planes	5 40
2 Jointer planes	5 00
6 Try "	9 00
7 Jack "	7 00
1 Jern Compass	4 50
1 Set hollows and rounds	1 00

2 Sets match planes	\$3 00
5 Bend planes	3 00
2 Rabbit planes	1 60
11 Nail hammers	11 00
3 Hand axes	6 00
2 Broad axes	7 00
1 Monkey-wrench	2 00
2 Cold chisels	0 50
5 Try squares	2 00
3 Framing squares	7 00
1 Panel square	1 25
4 Mallets	1 00
2 Spirit levels	2 50
2 Framing saws	6 00
3 Trowels	3 00
5 Screw drivers	2 00
Chalk and lines	2 00
2 Tool bags	0 80
1 Wire strainer and operator	10 00
Bench brushes	0 40
5 Carpenter benches	35 00
6 Ladders	6 00
2 Scratch-awls	0 30
4 Paint brushes	3 00
4 Oil cans	4 50
1 Glue pot	1 50
Gimlets and gimlet bit	2 00
1 and jorns	5 00
1 Stove	6 00
Fencing tools, spades, spoons, picks and mauls	10 00
1 Ralshet drill and bits	8 00
1 Block and tackle	12 00
1 Small anvil	5 00
2 Adzes	4 00
2 Four-inch chucks	6 00
4 Framing chisels	4 00
1 Set firmer chisels	5 00
2 Office desks	5 00
4 Hand screws	2 00
12 Brad-awls	1 00
Office books	4 00
1 Edging circular saw table, \$40 ; small saw table, \$20	60 00
1 Counter shaft, pulleys, hangers, etc	95 00
1 Leather belt	10 00
1 Wheel-barrow	6 00
1 Two-wheeled truck	16 00
1 Pair snips	3 00
Saw piles	5 00

\$488 50

EXPERIMENTAL DEPARTMENT.

Horse hoe, coffee mill, thermometer, barometer	40 00
Grain tester, 1 set scales and weights (table), 1 spring scale ..	27 00
2 Hand scoops, 1 dust pan, 1 varnish brush, 9 screws	5 00
2 Funnels, 1 set rubber printing type, 1 half-bushel measure..	4 00
1 Peck measure, 1 half-peck measure, 2 wire baskets	4 00

6 Turnip baskets, 1 mouse trap, 1 Paris green sprinkler	\$3 00
1 Broom, 2 canvas sheets, 1 fanning mill, set harness	25 00
1 Tarpaulin sheet, 1 threshing machine, 190 peck bags	45 00
1 Desk, 2 sample cases, 2 sets grain bins	13 00
1 Table, 1 stove, 4 wooden rakes, 1 mallet	10 00
4 Manure forks, 3 cattle brushes, 1 lantern, 1 stable broom . .	4 00
1 Pair cattle shears, 1 zinc pail, 2 cattle leaders	2 00
1 Sponge, 1 pair shears, 1 letter file, 1 box paper fasteners . .	2 70
1 Memorandum file, 2 corn planters, lettering brushes and paint.	4 55
1 Microscope, 1 band knife, 1 cradle, 1 scythe	7 00
1 Grain scoop, 3 shovels, 3 spades, 2 manure forks	6 00
1 Potato scoop, 1 potato grape, 1 garden hoe	3 00
1 Large hoe, 4 turnip hoes, 2 Dutch hoes, 4 spuds	6 00
1 Rake, 1 pick, 1 flail, 1 pair bellows	3 00
	<hr/> \$214 25

ABSTRACT.

Farm—Live Stock	\$16,562 00
“ Implements, etc	3,853 00
	<hr/> \$20,415 00
Garden	1,354 00
Carpenter	488 50
Experimental	214 25
	<hr/> \$22,471 75

APPENDIX TO REPORT

OF THE

Commissioner of Agriculture and Arts.

APPENDIX (F).

REPORT OF THE ONTARIO POULTRY ASSOCIATION, FOR THE YEAR
1880-81.



REPORT

OF THE

ONTARIO POULTRY ASSOCIATION

FOR THE YEAR 1880-81.

To the Honourable the Commissioner of Agriculture :

SIR,—In compliance with the Statute, I have the honour to submit herewith the Report of the Poultry Association of Ontario for the year 1880-81.

The Annual Meeting of the Association was held on Thursday, the 10th day of February, during the time of the holding of the Annual Exhibition at Brantford.

It was decided to hold the next Annual Exhibition of the Association at Brantford, and I herewith send you the list of officers, etc., elected for the ensuing year.

I have the honour to remain,

Your obedient servant,

W. SANDERSON,

Brantford, Ont., March 10th, 1881.

Secretary.

The Annual Meeting of the Poultry Association of Ontario was held on Thursday, the 10th day of February, 1881, and the following is the list of officers elected for the ensuing year, namely :—

President—E. Kester, Brantford.

First Vice-President—A. Bogue, London.

Second Vice-President—J. McClelland, Peterboro'.

Directors—W. H. Doel, Toronto ; W. J. Way, Toronto ; D. Allen, Galt ; S. Butterfield, Sandwich ; G. Murton, Guelph ; T. Gowdy, Guelph ; J. W. Buck, Brantford ; G. H. Pugsley, Brantford ; T. Elliott, Brantford.

Secretary—W. Sanderson, Brantford.

Treasurer—F. J. Grenny, Brantford.

Auditors—Jas. Fullerton, Strathroy ; R. M. Wilson, Brantford.

E. KESTER, *President.*

W. SANDERSON, *Secretary.*

BRANTFORD, *February 10th*, 1881.

R E P O R T.

The Exhibition of this Association was held in the Kerby Hall, Brantford, on the 8th, 9th, 10th, and 11th of February, 1881, and was everything that could be desired in point of excellence; the birds being in splendid condition, and every class being well sustained in point of quality throughout the whole show. The total number of birds shewn was 1,146, the entries in nearly every case being single birds, and were judged as such.

Asiatics.—The most prominent in these were the Light Brahmas. Number of entries, 53; an exceedingly fine lot of birds, being probably the best lot ever brought together in Ontario, and specially deserving of honourable mention. There were 16 entries of Dark Brahmas; all good birds. In the four varieties of Cochins there were 74 entries, the Buffs being especially excellent; also, some of the Partridge were extra fine. The new Asiatic breed of Langshans were represented by 12 birds, and although very similar to the Black Cochins, are claimed to be a distinct variety and to possess superior merit as layers.

Games.—Total number of entries, 123, in all the classes of which the Black-breasted Reds were the most numerous; all splendid birds. The show of Pyles, Brown Reds, and Duckwings was much larger and better than usual, containing many exceedingly good birds. Taken as a whole, the class of Games was extra fine and the quality well sustained, and, as was said of Light Brahmas, they were the best lot every shewn together in Canada.

Hamburgs.—The exhibit of Hamburgs, comprising 116 birds in the various classes, was extra fine, and the competition exceedingly close; although not so large as usual the quality of birds shewn was fully up to the highest standard.

Leghorns.—Number of entries, 70 birds; being a fairly good class, but not equal to former years. The absence of many good birds may be accounted for by the previous three months of very severe weather. Some new features were introduced in this class, being the Rosecomb varieties, both brown and white.

Spanish.—Only 6 birds shewn, being the smallest and poorest exhibit in this class for many years.

Plymouth Rocks.—Total number of birds shewn, 45; a very fine lot of birds, but scarcely equal in quality or numbers to previous exhibitions. The breeders in this class are going beyond the original type in regard to size, thereby losing the compactness of form, and also, no doubt, the early maturity of the old form or type which fills the place so well between the Asiatics and the smaller breeds.

Polish.—This class was represented by 64 birds in the four varieties; was one of the best lots ever exhibited. There were few birds, if any, that would score less than 90, the winning birds being very near perfection. A magnificent lot.

French.—Total entries, 40, the majority of which were Houdans, which were better than usual, as also were the few of Crevecœur and La Fleche which were brought forward.

Dorkings.—57 entries of the three varieties; all very good, and better than usually brought forward. An extra fine lot of birds.

Bantams.—105 entries of all varieties; the game varieties not being so numerous as usual, but excelling in quality, and containing many very beautiful birds. The Sebrights, Black African, and Japanese were also better than usual.

Turkeys.—Total number of entries, 46. The Bronze variety was most numerous, and the best and largest birds; the whole display being fully equal to previous years.

Ducks.—90 entries; the Aylesburys and Rouens being the best and most numerous, but very excellent specimens of Pekins and Cayugas were on exhibition.

Geese.—68 entries. As usual, the Toulouse and Bremen varieties were the most prominent, both in numbers and quality.

Pigeons and Cage Birds.—139 varieties. This part of the exhibition was not so well filled as in previous years, yet many fine specimens of the different breeds of pigeons were shewn. The cage birds were few, but very good.

New and Rare Birds.—About 20 entries were made, comprising Mandarin Ducks, Japanese Fur Fowls, Minorcas, Pheasants, etc.

The Exhibition was opened to the public on Tuesday night, the 8th February, and closed on Friday, the 11th February, at noon. The weather was wet and stormy, and made a very unfavourable impression on the door receipts, yet the hall was fairly attended. The judging was done on Wednesday, and gave very general satisfaction.

The management have this year done away with nearly all the old coops, introducing wire fronts and wooden divisions for coops, and hiring lumber for the top, back, and bottom; thus the material belonging to the Association can be readily stored away, and when wanted shipped at low rates to whatever point the Society may need it, where it can be put to use very easily in the same manner as at this exhibition.

Regarding the poultry business, breeders state that the demand is steady for pure-blooded birds; and although the high prices of a few years ago are not realized, yet they are getting remunerative prices for their stock, and they consider the business as settling into a firm and steady basis.

A few words for the poultryman who keeps and breeds for the market only may not be out of place. It is desirable for him to have only such breeds as will give him the best returns in eggs and poultry for the market. An eminent breeder in Massachusetts, U. S., has stated these breeds to be Light Brahmas, Plymouth Rocks, and White Leghorns. The Light Brahma is an excellent winter layer, and the early hatched chicks should be killed quite young—about ten weeks old as broilers, or at seven or eight months old as roasters. The Plymouth Rock is a good layer of eggs, and make excellent mothers; they are hardy, quick growers, and make the best of poultry for summer and early fall, thus filling a place between the small breeds and Asiatics, and so long as their friends are content to have them fill this place, they will remain one of the very best breeds for the poultryman. The White Leghorn is one of the greatest of egg producers. Pullets hatched in April will lay in September and October, and if favourably housed will continue to lay through the winter and on until moulting time, averaging about 200 eggs per year. The Leghorns can be raised very easily during summer months, as they mature very early, and killed quite young, to be used as broilers, coming in for this purpose after the Brahmas and Plymouth Rocks are passed. These three breeds are therefore particularly adapted for the poultryman, and by using them judiciously he can cater to the wants of the world for the year round.

Perhaps the best breed for the farmer is the Plymouth Rock, combining as it does more general good and economic qualities than any other. They are a fairly large fowl, very hardy and productive, make excellent mothers, and are easily reared. At six months old, cockerels will weigh eight and a half to nine pounds, and pullets about six pounds, and at this age the pullets will begin to lay freely and continue to do so throughout the winter. Thus if hatched in April and May they are sufficiently matured to pay well as poultry in the fall, and also to stand the severe changes of weather in late fall and early winter. They are as fully matured at six months as a Brahma at nine months. It would be well if breeders would not strive to make the Plymouth Rock a breed of Asiatic size, as by doing so they are growing them beyond the point of merit. This breed can never supplant the Brahma by being equal in size, for directly this size is attained it will be equally long in maturing. It is very desirable to retain the early maturity which, with fairly good size, makes this breed so valuable to the farmer. There are many other breeds that would be excellent stock for the farmer to keep, yet whatever breed may be selected it ought to combine most of the good points of the Plymouth Rock.

It would be a very desirable thing if statistics could be had of the poultry and egg trade, so that we could give the actual money value of the poultry and egg trade of Ontario. We have no statistics at command to supply this very important information.

An American breeder and lecturer gives the following figures as gleaned from the census returns of the United States, taken from under the head of "Agriculture," and shews that the poultry interest stands second to none under that head, viz. :—

In 1870 the Hay crop was valued at	\$336,000,000.
" Corn " " 	304,400,000.
" Wheat " " 	288,000,000.
" Cotton " " 	155,000,000.
" Dairy Products " 	155,000,000.
" Meat (Cattle, Sheep and Pigs) nearly ..	400,000,000.

and from the figures which he has at command regarding reports and home consumption, he computes the egg and poultry production of the United States to amount to the enormous sum of over five hundred million dollars. The poultry and egg trade of Ontario is as yet in its infancy, yet if a similar calculation could be gone into for Ontario we would arrive at a similarly astonishing result. There is no doubt but this trade is enormous.

In concluding these few remarks, we hope the Association may see its way to further advance the interests of the poultryman as such, and by so doing extend its sphere of usefulness.

All of which is respectfully submitted.

E. KESTER,
President.

W. SANDERSON,
Secretary.

POULTRY ASSOCIATION OF ONTARIO.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR 1880-81.

<i>Dr.</i>	
To Balance from last year	\$167 85.
“ Entry fees	465 70
“ Members’ subscriptions	86 00
“ Sales poultry, etc.	7 75
“ Special prizes	29 00
“ Door receipts	103 70
“ Grant from Ontario Government	700 00
“ “ City of Brantford	50 00
“ Cash borrowed	50 00
“ Balance due Treasurer	1 46
	<hr/> \$1,661 46
<i>Cr.</i>	
By Indebtedness to old Brantford Society	\$100 00
“ Coop fronts and furnishing	152 59
“ Printing and advertising	65 35
“ Poultry sold	5 40
“ Prizes	965 70
“ Expenses—	
Judges	\$30 00
Directors	19 20
Freight of coop from Guelph	32 98
Teamage of same	9 00
Rent of hall, light, etc.	35 00
Use of lumber, etc.	55 78
Feed	11 80
Help at Show	38 75
Sundry expenses, including postages	39 91
Secretary’s salary	100 00
	<hr/> 372 42
	<hr/> \$1,661 46

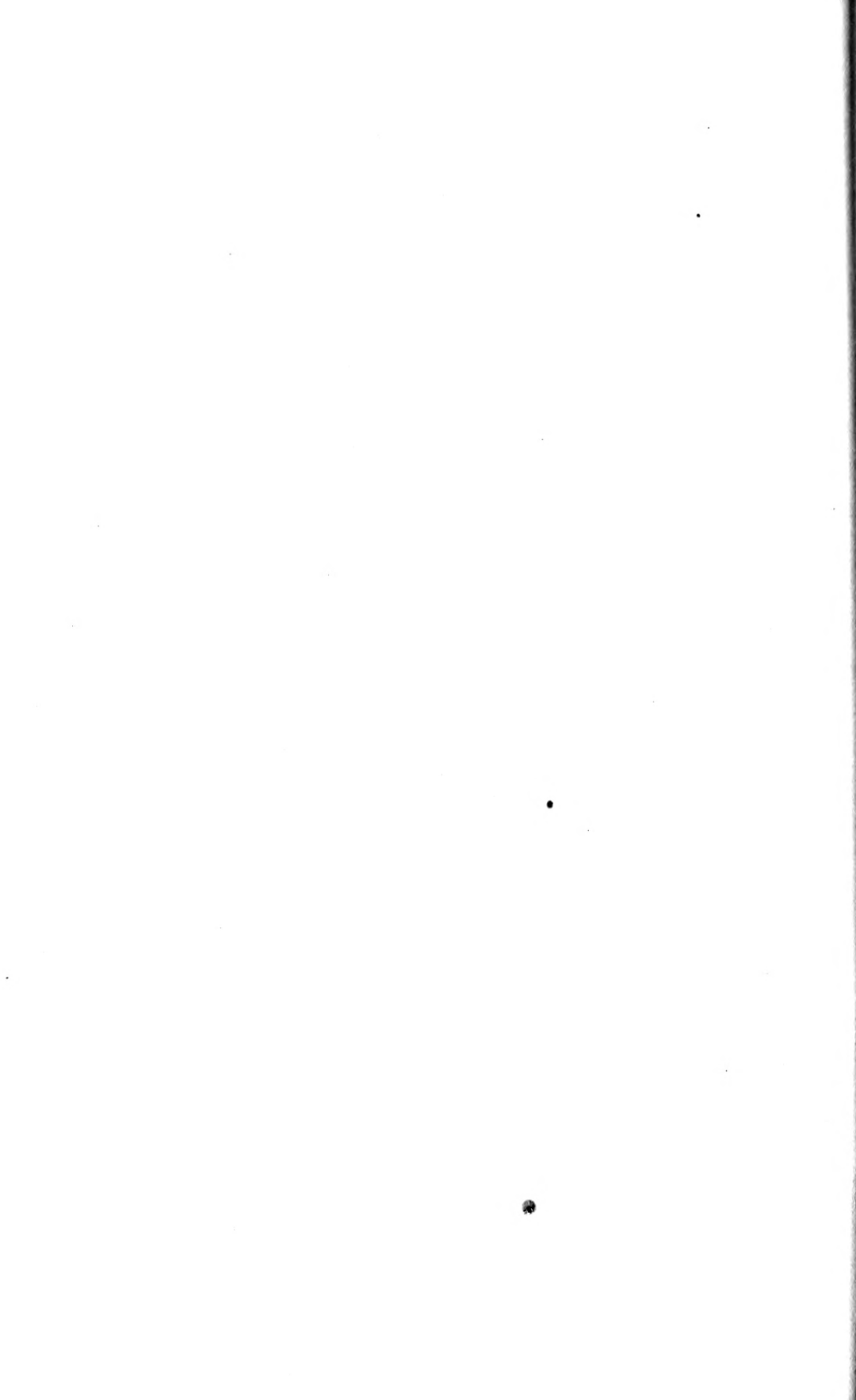
We the undersigned auditors hereby certify that we have examined the books of the Secretary and Treasurer of the Poultry Association of Ontario, and compared them with the vouchers, and have found them correct.

JAS. FULLERTON, }
R. M. WILLSON, } *Auditors.*

We the President and Secretary certify that the above is a correct statement of the Poultry Association of Ontario for 1881.

E. KESTER,
President.
W. SANDERSON,
Secretary.

BRANTFORD, September 10th, 1881.



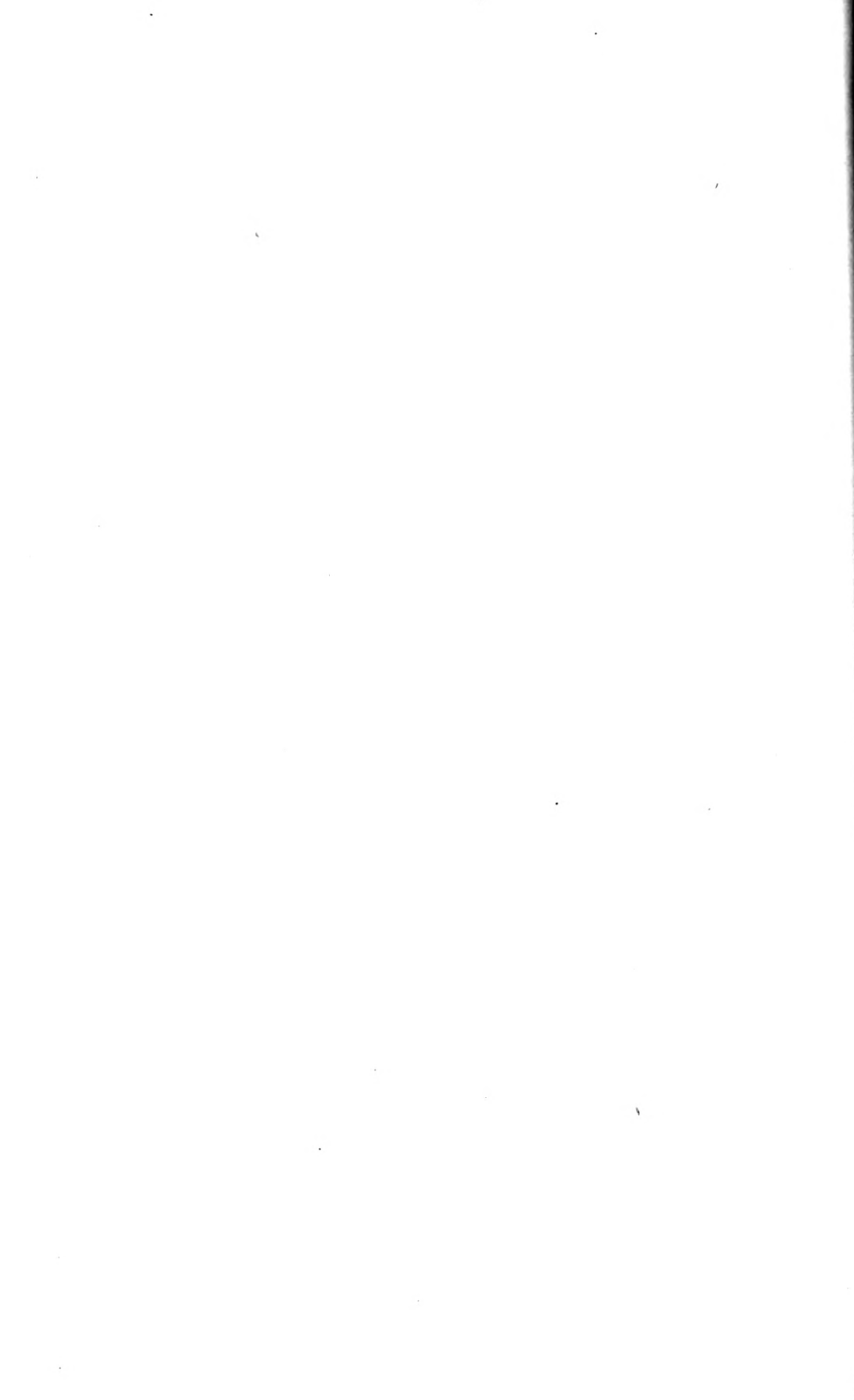
APPENDIX TO THE REPORT

OF THE

Commissioner of Agriculture and Arts.

APPENDIX (G).

AGRICULTURAL STATISTICS: THEIR VALUE, HISTORY, SCOPE
AND SYSTEM.



APPENDIX (G).

AGRICULTURAL STATISTICS:

THEIR VALUE, HISTORY, SCOPE AND SYSTEM.

TO THE HONOURABLE S. C. WOOD,

Commissioner of Agriculture:

Agreeably to your instructions I have prepared, and have now the honour to submit the following Report on the subject of Agricultural Statistics:

The favour with which the Report of the Agricultural Commission of 1880 has been received by the farmers of the Province affords great encouragement to consider what means can be adopted for giving continuity to work so well begun.

The labours of the Commission extended over a wide field, but the subject of inquiry was not exhausted. Indeed it was not possible that it could be, having regard to the fact that agriculture is essentially experimental and progressive.

Every requisite of food and clothing is an annual product of the earth, yielded in a large degree in proportion to the industry and ingenuity employed on it by man, but modified by conditions of soil and climate, and dependent year by year on the sun and rain in due season.

The husbandry of the past fifty years is a record of marvellous progress, both in methods and results. Intelligent farming is no longer confined to a score of men in a country, or one man in a county. We see the evidence of it on every side,—in the use of labour-saving implements, in the increase of improved breeds of live stock, in the drainage of the soil, in the rotation of crops, in the application of fertilizers, in the development of the dairy system, and in the great diversity of products of the field, orchard and garden. There has been a steady and general levelling upwards.

Throughout this period Governments have taken a keener interest than ever before in agricultural affairs. In every country of Europe, with, I believe, the single exception of Turkey, there is a ministry, bureau, or sub-department of agriculture, with an organized system for conducting inquiry and reporting facts in all matters affecting the interests of the farmer. The same thing is true of the United States, as well as a number of individual States, and also of our own country, though in a less degree.

By encouraging exhibitions, collecting and publishing valuable information, introducing new breeds of live stock or new varieties of grain, fruit and seeds, taking measures to check the ravages of disease upon animal or plant life, and establishing colleges and experimental farms for the special education of farmers' sons, Governments have done much to aid and direct the operations of the husbandman, and to give him larger profits for the fruit of his labour.

In our own land this is a wise policy. It is as an agricultural people that we are best known, and the agricultural interest of the country is the most important interest. It is the power, the wealth of the country, and every effort to add to it should be

approved and encouraged. There is where our strength lies, and there is where we want information.

No one seriously doubts the utility of correct information on the supply of food, to town and country, to rich and poor, to farmers and merchants. It enters largely into the commercial combinations of every year, and is one of the chief elements affecting circulation.

This is a field in which Governments have almost exclusively the means of making an extensive series of observations, and perhaps there is not any greater service that the Government could render to the farmers and business men of this Province than to collect reliable statistics of its agricultural wealth from year to year.

One of the primary subjects of reference in the instructions to the Agricultural Commission was the present constitution, functions and powers of the Bureau of Agriculture, with a view to giving it increased efficiency. The Commissioners were invited to report on the enlargement of the operations of the Bureau and the imposing on it of such new duties as the collection of agricultural statistics and periodical crop reports, the encouragement of experiments in new processes of agriculture, and generally a careful study of all matters affecting the interests of the farmer in our own and other countries. But owing to a desire that their Report should be laid before the Legislature during its last session, and to the work in connection with other subjects being of greater volume than was anticipated, the Commissioners were reluctantly compelled to leave this one untouched. In their Report, however, they say:

"In his recommendation to Council the Commissioner of Agriculture gave considerable prominence to the suggestion that the Commissioners should report upon the functions of the Bureau of Agriculture, with a view to its reorganization. In this connection the subject of agricultural statistics would have held a foremost place. It can hardly be doubted that an enlargement of the powers and functions of the Bureau would be very desirable, in order that a more active supervision should be exercised over the applications of the public money voted for the encouragement and advancement of agriculture, and that the Department of Agriculture should be more closely identified with the great agricultural interests of the Province than, with its present limited machinery, is possible. But, for reasons already set forth, the Commissioners feel unable to do more at the present time than advise that the subject should receive the early attention of the Government and Legislature, and to state that, in the event of such a reorganization of the Bureau as is suggested, the Commissioners would view with much pleasure any well-considered scheme for utilizing the experience and information of practical agriculturists, in an advisory sense, in connection with the operations of the Bureau."

It appears to be both practicable and desirable to extend the operations of the Bureau in the direction indicated by the Commissioners; and, having regard to the value of agricultural statistics and crop reports to every interest of the country, it is of much consequence that the system be complete and that the work under it be well done. In the presence of so much rivalry on the part of sister Provinces and of neighbouring States, it is desirable that we should know, and that we should let others know, the extent of our resources and the measure of our progress.

THE VALUE OF STATISTICS.

The value of statistics is apparent in this, that it is mainly through the pursuit of statistical inquiries we can be assured of real advance in the knowledge of human interests. The statistic aims at discovering the actual condition of his country and the causes of that condition, with a view to discover also the methods of improving it.

By the aid of statistics just data are supplied to guide the exertions of the philanthropist, the judgment of the legislator, and the speculations of the reasoner. Facts unimportant in themselves, as Sir George Lewis has observed, become important as units comprised in a complete enumeration, and results are thus obtained to which mere conjecture, or the loose and vague impressions derived from a partial observation, could not have led.

Figures give definiteness and precision to ideas. With regard to questions of drainage,

ventilation, food, and the use or abuse of strong drinks, it is the statistical information supplied on a large scale which alone can be conclusive. It is the essence of statistical inquiry that by dealing with masses it eliminates individual peculiarities.

Statistics of the census, post-office, customs and excise, and the courts give to us collectively the social and economic history of the age in which we live. They prove that there is uniformity in all human affairs, and that there is permanence and steadiness in the laws which regulate our existence. From statistics history borrows a considerable portion of her light, to general public law they contribute most valuable materials, and they enrich politics with a multitude of practical data.

A report showing the actual territorial wealth of the country, the different branches of its produce and the mean returns which they afford, would be invaluable to the economist and the legislator. By proving numerically the happy effects of any measure of economical legislation the trustees of power would be taught the superiority which may be acquired by the prompt imitation of nations most advanced in agriculture and manufactures, and in the manual perfection of the arts and trades. Government has an interest in the enlightenment of labourers, whether agricultural or mechanical, for they are the real producers of wealth. It is its duty to do for them collectively what they have no means of doing individually, or even by organized association.

The value of information depends on its accuracy. An annual record of trustworthy facts, setting forth the productive power and value of both land and labour when employed to the best advantage, could not fail to produce a healthy, stimulating effect. The influence of thousands of good examples would tell powerfully in favour of advancement all along the line. The counting of cows, a distinguished English agriculturist has remarked, is the first step towards their universal improvement—especially should the count give their annual product of butter and cheese.

If the returns for one county show that larger and more profitable crops are raised than in another not inferior to it in fertility, the cultivators of the latter will not long remain contented with the results. Manufacturers living together in towns soon learn to know of new inventions and appliances, and adopt them if useful. Farmers, on the other hand, live apart, and rarely exchange professional knowledge. Even when the result of a successful experiment reaches their ears they cannot be sure that the circumstances have been faithfully detailed, or that the advantages of the new method may not be due to accidental causes or a propitious season. The manufacturer sees for himself, and can weigh and judge for himself. The information procured by an efficient Bureau would in a great measure remove the disadvantage in this respect under which the farmer suffers. Results resting upon the practice of hundreds in the same circumstances as himself must be received as undoubted facts, and, like the manufacturer, he must be driven to the adoption of whatever might come to him thus recommended.

Our farmers have great advantages for the economical production of beef and pork, mutton and wool, and it will render them a valuable service to obtain correct information of all discoveries and improvements either in the growing and feeding of domestic animals or in the curing of provisions; also as to the number of animals fattening in the country, and the probable demand for them in the home and foreign markets.

The profit is in the last few extra pounds of meat, cheese or butter, as well as in the extra bushels of wheat, corn or barley. How to produce this extra is a question of vital moment to every farmer, and to the whole country. If by an improved system of tillage, or the use of fertilizers, the average wheat product of the country can be increased by one bushel per acre, the aggregate gain will be very great. On the area in Ontario, as given by the census of 1871, it would be nearly a million and a half of bushels.

In one of his letters to Sir John Sinclair, Washington says that when he entered the public service in the Revolutionary war his flock of 1,000 sheep clipped 5 lbs. per fleece; when he returned to his estate at the close of the war he found his flock so degenerated, under the care of a foreman of the old school, that the average clip was only 2½ lbs., then, as it is now, the average yield of the Virginia sheep. In Ontario, according to the census of 1871, the average was 4½ lbs., but we have many flocks of long-woolled sheep that yield as high as 8 and even 10 lbs. A fair average, with intelligent care in feeding and breeding, should not fall below 6 lbs., and this on the sheep census of 1871

would give us an extra 3,000,000 lbs. for the whole Province, or an annual addition of \$1,000,000 to our wealth by wool alone.

The great defect in our agriculture is the failure to rear the proper number and quality of animals. If the quantity of live stock were doubled, the aggregate of grain produced might also be greatly increased, without any corresponding increase in expense. But there is danger in running to extremes; the farmer must seek to avoid over-production.

At present industrial facts are ascertained for us by the census, which is taken only once in ten years. But the whole condition of agriculture may change in that period, so that at best the information of the census can be only a subject of curious interest to the farmer; it will not help him to decide what he fairly ought to get for his grain and live stock, and whether to sell or to hold it; it is gathered and published at too wide intervals of time for practical usefulness or guidance.

Agricultural journals and daily and weekly newspapers are doing invaluable service to the country, but they cannot work under an organized system, nor cover the whole ground of inquiry. The experience of the ablest and best-conducted journals of England, the United States and our own country is that, with the most painstaking effort, the collection of statistics and reports is fragmentary and unsatisfying. Governments alone can do the work efficiently and continuously.

Every farmer knows that the price of his products is regulated by the law of supply and demand. Prices naturally tend to the equilibrium found under this law, and for a high price obtained under a false impression of scarcity the producer pays the penalty through prices running to the other extreme.

The grain-dealer or the speculator on the corn exchange, with a longer purse and better means of information than the isolated farmer, can learn the probable yield of crops sooner than any one else, and may sweep the markets before prices have moved. But if statistics were furnished by the Government every one would be as well supplied with information as the dealer or the speculator on the exchange. Hence the value of authentic reports on the condition of crops throughout the country and the world.

The misrepresentation of crop reports—which is a common device of speculators—is hurtful to the farmers, who are for this reason deeply interested in having trustworthy information. They have the earliest command of the market, and may take advantage of that position if they have the means of accurately anticipating the course of prices. It is no gain to the consumers that dealers or speculators have bought in a low market. They must pay the figure as fixed by supply and demand, and the lion's share of profits is seized by the middleman. Accurate statistics and reports, affecting the commercial dealings in farm stocks, would enable the producer to get a more equitable distribution of profits, and to steadily increase his productive capital. At the same time they would aid the dealers who do a fair and legitimate business; it is the gamblers on the great corn exchanges who work mischief to farmers and to the trade.

A few illustrations of the practical use and value of crop reports, as collected in an imperfect way by the Bureau at Washington, may prove instructive and interesting.

The corn crop of the Union for 1863 was injured by the fall frosts to the estimated extent of 135,000,000 bushels. When this fact became known through the monthly report of the Agricultural Department an advance of 20 cents per bushel was established, and the farmers reaped the benefit of it. The October Report for the same year showed a decrease in the hog supply, and the market for hogs likewise improved immediately.

In the January Report for 1873 the secretary of the Agricultural Association for Perry County, Indiana, writes:

“About the time of the potato harvest this fall (1872), our producers were all astray respecting the market value of the potato crop—one of our main crops in this section. This uncertainty was taken advantage of by buyers, and they swarmed down on our producers early in the day, offering 50 cents per bushel. Some accepted the offer, but the vast proportion of our farmers concluded, at the request of the Association, to await the report from the Agricultural Department. It reached us in proper time, and a careful analysis was made of its reports of the potato crop. Our people acted on it, and the result was a gain of many thousands.”

The low price at which the few sold was no gain to the consumer, and the high price was no loss. Under any circumstances he was bound to pay the price fixed by the demand, and the speculator only failed to make large gains through the producer refusing to sell at his offer. By waiting and taking counsel of the reports the farmers themselves got the benefit of the good prices, and it is a sound maxim that the profit should go to the men who earn it.

But the work of the Bureau at Washington is too imperfect to foil the designs of the speculator, or correct the misrepresentation of crop reports so as adequately to protect the producer against loss. In the first place, the number of correspondents is limited—there being only four thousand for the whole Union, or an average of two for every three counties; and in the second place, the reports are not issued with sufficient promptness. The consequence is that the speculator is given a margin of time for his work.

It is a well-known fact that an assumed or a reported scarcity has at first the same effect on prices as a real one has. The rise is just as rapid, the fluctuations just as violent, and the final result more disastrous. What occurred in 1879 will show how the game of the speculator is played.

As early as the 1st of July the heavy grain-buying firms of New York and Chicago knew that the wheat crop was abundant in their own country, that it was a failure in Great Britain and some of the European states, and consequently that the export demand would be very great. They had experienced men moving about in the country getting accurate information, and local buyers who made regular reports on the state of the crops. Upon the facts collected in this way, and which were sacredly treasured in their own offices, the grain kings formed their judgment; they gave to the public only what served their own ends. The fact that there was a large foreign demand they either suppressed or denied, and the fact that there was an unusually large crop in their own country they brought out with emphasis. If the farmers were as well informed as the leading buyers, they would have held on for an advance; but they were not, and before the issue of the Washington report a great portion of the winter wheat south of the latitude of Chicago was disposed of at 90 cents per bushel. The price then quickly rose to \$1.20 per bushel, and the farmers of the spring wheat belt were paid about \$1.30. The wide margin of profit on early sales, which should have gone to the farmer had prompt information been given by the Bureau, was swept by the New York and Chicago dealers as their winnings in the game.

Large quantities of the wheat in store were disposed of at a fair market price, but the more reckless speculators resolved on another move. They determined to force up the price of wheat by pointing to the great foreign demand, and declaring that the home crop had been largely over-estimated. But this stratagem had no effect on English buyers. They had the carefully-collected Crop Reports of their own country, of the wheat-growing countries of the Continent, of the Australian colonies, and of the Bureau at Washington, and they knew that the wheat supply of the world was ample for the wants of the year. They bought wheat everywhere but in New York and Chicago, and the result was that in a few weeks the American ring was broken. The speculators were not strong enough to carry their load; but, besides the serious fall in prices, their collapse came very near to precipitating a commercial crisis. Early, accurate, and generally-diffused information as to the state of the crops at home and abroad would frustrate all such attempts of the grain speculators to "bull" or "bear" the market.

Another instructive lesson is furnished by the Crop and Stock Reports of Ohio. The wheat crop in the State last year was fair, and had it been equally good all over the country the price would probably not have gone above \$1.20 in Chicago. But the reports for Illinois, Iowa, and Michigan—the only other winter-wheat States that have adopted the plan of monthly crop reports—indicated that for those States the yield would be less than half that of the previous year. This information was promptly given to the press of the whole country, and advance-sheets of the most important points and conclusions from each month's report were sent out in the same way. The Ohio Report for October says:

"Farmers read the facts in many papers and on every hand, and the whole community came to believe and know that at least the wheat and corn crops of 1881 were really

short, and that the prices must rule high ; and, as a rule, the farmers held and realized the profits that legitimately belonged to them. And so this information thus gathered by the State Boards of our own and a few other States, and thus widely published, has, in the opinion of judicious men who are acquainted with the facts before and since this work was begun, been worth more than \$10,000,000 to the farmers of Ohio alone. For that sum would be less than thirty cents a bushel on this year's crop, and that thirty cents (or \$10,000,000) would have gone largely into the hands of speculators but for this prompt and reliable information in the hands of the farmers and of the public generally. Indeed such was really the case with the crop of 1879, before this Crop Report work was begun by any State except Illinois."

Owing to the long-continued drought last year the bean crop was short in Ontario, and also in New York and Michigan. This was known to dealers early in the season, and before the crop was fully harvested a great portion of it was secured by their agents at prices ranging from \$1.25 to \$1.60 per bushel. A few weeks later it was quoted in the Detroit and Montreal markets at \$3 per bushel, and the lumbermen of Michigan and the Ottawa Valley, who had delayed the purchase of supplies, were obliged to pay outside figures to the speculators, who were thus well rewarded for the cost of early information. Under an efficient system of collecting and publishing crop reports this advantage would have gone to the producers.

These illustrations will suffice to make clear the practical value of statistics and reports, both to the producers and the consumers of food. Other uses which they would serve I need only indicate.

They would encourage the keeping of farm accounts—necessary in order to make fairly accurate returns.

They would direct the purchasers of live stock to the sections in which supplies may be most easily obtained.

They would give a basis of certainty upon which to compute the country's annual surplus of products, or its requirements.

They would serve to prevent panic and sudden and unnecessary fluctuations in prices.

They would, by showing the probable extent of employment in the carrying trade, enable the shipping and railway interests to make timely provision for it.

They would mark the tendency to over-crop, and, consequently, to impoverish the soil, and demonstrate the value of fertilizers and the importance of a reform in tillage.

And lastly, they would note the resources of the country, its capabilities and its progress in material wealth, and so serve to attract population and capital from other lands.

To ascertain the present state of the country, to compare different places at the same time, and the same place at different times, are objects of great interest to every citizen.

THEIR HISTORY.

Having considered the uses and purposes of agricultural statistics, I propose in the next place to treat of the subject briefly in its historical aspect. This is desirable in order to show what other countries have done, and to learn what their experience teaches.

In Great Britain statistics of every kind have made slow progress. It took nearly half a century to carry a measure in Parliament for taking the census of the nation, the first Bill having been introduced in 1753, and the first census taken in 1801. The various published statistics consisted for many years of returns to Parliament presented without regularity or order, and it was not until 1832 that a statistical department was created at the Board of Trade, with the object of arranging and systematizing publications and returns. Since that year statistical offices have been created in connection with other departments ; but various reforms have been made in the conduct of the work, and a Royal Commission appointed in 1877 has been engaged for four years in an effort to simplify and systematize the whole body of statistical returns. Their Report, which is exhaustive and valuable, now awaits the action of the Government.

In England it required the lifetime of a generation to remove the prejudices of the farmers against the collection of agricultural statistics. They feared that the scheme had

something to do with local rates or the national taxation, or that it was a device of landlords to learn their true condition and raise the rents.

In 1836 Mr. Poulett Thompson, President of the Board of Trade, conceived the idea of collecting information through the clergy, but prudently resolved to test his plan at first in one county. Printed forms were prepared asking for returns of the whole land—wood, waste, and under cultivation; the acreage and yield of the different crops; the number of each kind of live stock, and the average rate of wages. These were sent to the clergymen of 126 parishes in the county of Bedford, but the result was so unsatisfactory that the plan was abandoned as hopeless; only 27 of the 126 clergymen made any return.

Various other experiments were subsequently made, and the subject was taken up in Parliament. From 1845 to 1864 bills and resolutions were introduced and discussed session after session, and a score of schemes were considered, only to be dropped or rejected.

In 1853 authority was granted by the Government to conduct an experiment in two English counties by the Poor Law Board, and in three Scottish counties by the Highland Agricultural Society, under a scheme prepared by its secretary; and in the following year the experiment was extended to eleven English and Welsh counties, and to the whole of Scotland. The making of returns was purely voluntary, but while in Scotland the extent of failure was less than one-fifth of one per cent., it was in England seven per cent. The difference of results was attributed to the kinds of machinery employed; there was a strong prejudice against the Poor Law Board, and the Highland Society was trusted as the farmers' friend.

No further effort was made at that time to collect statistics in England, but the work was continued in Scotland until interrupted by a dispute over patronage and the audit of accounts. The Treasury asserted its right to name the collectors as servants of the Government, and insisted upon all accounts passing through the Board of Audit. The secretary of the Society refused either to yield the patronage or submit to an audit, and he settled the dispute by stopping the work.

The success of the experiment, however, proved the value of such statistics, and helped to remove the prejudice against them. Finally, in the session of 1864, a resolution was carried in the House of Commons affirming that the collection of agricultural statistics was desirable, and in June of the following year the President of the Board of Trade asked for and obtained a vote of £10,000 to enable him to effect the aim of the resolution.

In the same month the rinderpest made its first appearance in England, and spread rapidly throughout the kingdom. A Royal Commission was appointed to consider its origin and nature, and after taking some evidence they wrote to the Board of Trade urging "the importance of obtaining correct information respecting the number of horned cattle and sheep in the country." The Board concurred, expressing the opinion that if such information were obtained it could not fail, at that time, to be of great utility and interest to the agriculturists and to the public at large. Orders were forthwith given for the preparation and distribution of schedules, and it was expressly stated that "the number of live stock belonging to individual persons will not be divulged." The returns were made on the 5th of March, 1866, through the medium of officers of Inland Revenue, and the report was published on the 7th of May. It gave the number of cattle, sheep and pigs in each county, the number of cattle that died or were killed on account of the plague up to the week ending 21st April, and also the percentage of losses.

This was the initiation of agricultural statistics in England and Wales, and, as already indicated, it had its immediate origin in the incidence of the rinderpest. The preventive measures to check the disease, and the scheme for compensation accorded to those whose cattle were sacrificed in order to save the stock of others, almost necessitated a cattle census. Its practical use was so apparent that the action of the Board of Trade met with ready approval, and when it was followed up in the same year by a request for the acreage returns a very friendly response was made. These returns, when prepared and issued, were largely circulated in the agricultural districts for the purpose of making known the information afforded by them, and also of showing that nothing was published which could in any way injure the interests of individual occupiers of land.

In this way the farmers of England became convinced that the collection of statistics was a matter of special interest to themselves, that it was not a device to increase rent or taxes, and that even its inquisitorial character was redeemed by a worthy object.

The information contained in the returns consists of the total area of land occupied; the acreage under each kind of crop, bare fallow, grass and permanent pasture; the acreage under orchards, market gardens, nursery grounds and woods; and the number of horses, cattle, sheep and pigs.

The great number of occupiers and owners of land in Great Britain makes it necessary to have a large staff to collect those returns, and the officers of Inland Revenue have been selected for the work by the Government, "as a convenient and efficient local agency to obtain the information with as little trouble as possible to the occupiers of land." It is the duty of these officers to distribute and collect the forms, and to tabulate them for the counties. The forms are issued to all occupiers of land—stamped for free transmission by post—and thus a ready means is afforded for their prompt return to the local officers. In cases where the returns are delayed or refused, the officers are required to collect them personally, or make estimates from their own observation, which is the cause of considerable delay in their reports to the Board of Trade.

The returns were at first collected on the 25th of June, but in 1877 the date was changed to the 4th of June, the object being to secure earlier publication. In that year the summary was issued on the 21st of August, instead of the middle of September as in previous years, and the complete tables and report at the end of September. Last year the summary was issued on the 15th of August, and the complete report on the 24th of September. It is also found that by the change to the earlier date in June the farmers have more leisure for filling up the schedules, and that some who flatly refused to do the work before, during the busier season, do so now readily.

In 1876 the acreage obtained by estimate in England—where farmers refused or neglected to make returns—was 2,178,515; last year it was only 1,584,228 out of a total of 32,211,512 returned, or 5 per cent. In Scotland last year the acreage estimated was only four-fifths of one per cent., and in Wales only one-tenth of one per cent.

In his report last year Mr. Giffen remarks that, especially in England, "the tone of the collectors as regards the disposition of farmers to make returns is, in many districts, more and more satisfactory every year, and on the whole there is a steady improvement." I need only add that in Great Britain the statistics are collected without legislative authority, and that the giving of information is purely voluntary; the duties of collectors alone are mandatory.

The average prices of agricultural produce in England are published weekly and annually in the *London Gazette*, as directed by Acts of Parliament. The basis of the weekly average is a division of aggregate proceeds by aggregate quantities sold, compiled from all markets prescribed by the Statutes, and the annual statement is made up from the weekly returns. The Scotch plan—the primary object of which is to fix the tithe commutation—is by means of an assessment jury summoned by the sheriff and examined on oath, whereby the value of grain not sold but used at home is included.

Ireland possesses a very complete system of agricultural statistics. It had its origin in the period of the potato famine, the first report covering the years 1847-8, and its value was so clearly demonstrated at that critical time that it has been maintained ever since. Besides being thus commended by long use, the plan has been endorsed by the International Congress of Statisticians, who have adopted it as their own and recommended it to other countries.

The data of the returns are collected by members of the constabulary force, who visit each farm or holding to ascertain from the occupier or some other person connected with the farm, the particulars required. This work is carried on under the superintendence of the Registrar-General, at Dublin, and his reports are made to the Lord-Lieutenant. An abstract is published at once, and the detailed report is presented to Parliament. Briefly stated, the returns show:

1. The extent of tilled, untilled and waste land, the number of holdings and their size in statute acres, and the number of stockholders, and quantity of live stock—by poor law unions, baronies, counties and provinces; and

2. The extent of land under crops and its value, the estimated produce of the crops, and the number of holdings exceeding one acre—by poor law unions, counties and provinces.

There are also comparative statements under each of the above heads, embracing a period of ten years, the number of scutching mills in each county and province, tables of meteorological observations, and remarks on the probable cause to which the good or bad yield of the various crops in each district may be attributed.

The enumerators number about 3,400, but being in the regular service of the Government they receive no extra pay for the collection of statistics. The work is commenced on the 1st of June, and usually finished by the end of July. The names of the several parties from whom the particulars of tillage and live stock are obtained are given in the returns, with a view to further inquiry should it be found necessary.

The abstract report of the Registrar-General is prepared from summaries made by the enumerators, and is limited to showing the acreage under crops and the number and description of live stock in each county and province. The estimated produce of the crops is reserved for the detailed report, based on information given to the enumerators by practical farmers and others qualified to form an opinion as to the yield in their respective districts.

The Registrar-General bears testimony to the courtesy of all classes connected with the land in giving the information necessary for compiling the statistics, and to the zeal and efficiency with which the enumerators discharge their important duty.

In Belgium and Holland every kind of information connected with agriculture is collected under the superintendence of a body of gentlemen, usually proprietors of estates, who are elected for purposes of local government. Returns are made to these officers at certain periods by farmers or occupiers of land, and the result is every year the subject of a detailed report printed under authority of the Governors of the provinces.

In France the Ministry of Agriculture collects monthly reports on the cereals in the agricultural districts and the result of the various crops, and compiles other special statistics,—the number of live stock, on silk-worm rearing, vine-culture, etc. The local returns for the Ministry are prepared by the *prefets* from the statements of statistical district committees.

Hungary, which is eminently an agricultural state, devotes great attention to the work. The product of the crops is collected yearly by means of inquiry forms, which are distributed to every parish and filled up by the parish magistrate, with the assistance of the most intelligent farmers. The forms are then collected, examined as to the correctness of their filling up by the Statistical Commission of the district, and sent in to the Statistical Bureau for the county and country summaries to be compiled and published. The data relating to vine culture and agricultural implements and machines are worked out in the same way as those of the crops product, with this exception, that the implement statistics are not collected annually, but at uncertain intervals when required.

In Austria and Austro-Hungary very full statistics of crops and live stock are procured. In the latter country the statistics relating to the crops collected since 1869, and those relating to the annual increase of cattle, first published in 1875, are based upon estimates of the greatest possible accuracy and extent, "prepared by unprejudiced men well acquainted with the agricultural characteristics of the various Crown lands." These estimates, an official report states, "are preferable to figures worked up by men little acquainted with the subject, and possessing small skill in arithmetical manipulation." For the same reason the original inquiry forms are sent in to the Bureau without any working out, experience proving that accuracy of statement and promptness in publishing the returns can only be secured when the actual first entries are laid before the figure critic. The information relating to crops is supplied by the agricultural unions, who prepare the facts for their own districts.

The States of the German Empire had their respective systems under the Zollverein, but in 1870 a Commission of statisticians and administrative functionaries met to develop a uniform system. The work of the Commission was not completed until the following year, when the Empire was established, and their report was made the basis of an Imperial system of statistics. It consists in the collecting and compiling of information

furnished either exclusively by, or in co-operation with, the Governments of separate States, according to special instructions from the Imperial authorities. The agricultural statistics of the Empire under this plan were first collected in 1878. They are given under three heads, viz., (1) Agricultural Employment of the Soil, (2) Proceeds of the Harvest, and (3) Returns of Live Stock, and are very elaborate.

The various other countries of Europe have their several systems, but those of Sweden and Denmark are the most complete, giving the acreage under crops and grass, estimated quantities of the crops produced, and the number of live stock.

The present advanced state of agricultural statistics in the old world is largely due to the teachings and the influence of the International Statistical Congress. The resolutions of this learned body, adopted in 1877 at the meeting held in Buda-Pesth, will be found worthy of careful consideration in framing a system for Ontario. They are in substance as follows:—

1. The Governments of all countries to collect special meteorological observations in connection with agriculture, to be submitted to a central authority, elaborated, and published regularly.

2. To have regular monthly reports by special agents (crop reporters) on the state of cereal vegetation in their districts.

3. To secure observations regarding the influence of the destruction of forests and of re-planting on climate.

4. To gather at as many points as possible in each country observations regarding storms, hail and periodic phenomena relating to plants and animals; the result to be centralized, co-ordinated and published.

5. To establish a certain number of meteorological observatories in connection with each other, the observations to be made known immediately to crop reporters, and a knowledge of them spread abroad to prevent the effects of frosts, inundations, etc.

Such a system, adopted and efficiently worked by the States and Provinces of this continent, would render to the agriculturist an invaluable service.

In the Australian colonies good progress has been made. A conference of Government statisticians, representing the colonies of Victoria, New South Wales, South Australia, and Tasmania, was held at Hobart Town in 1875, when resolutions were adopted covering the whole domain of social, industrial, commercial, and financial statistics.

The conference recommended in its report that the agricultural returns should embrace the area of land in occupation, the acreage and produce of crops, the weight of cereals and their market price, the number of hands employed and the rates of labour, the number of live stock, the number and value of agricultural implements, and the value of machine labour.

In its main features this was simply an adoption of the Victorian system. In Victoria there is an Act, called the Local Government Act, which obliges all municipal bodies throughout the colony to collect such returns as the Government statistician, with the approval of the Governor in Council, may direct, and all people are bound to give the information required to the municipal collectors under a penalty of £10. In this way the agricultural statistics are gathered without any expense to the Government.

The forms are distributed to the local bodies by the official statistician, and at a specified time the work of collecting begins. One schedule is filled up at each agricultural holding, and the proprietor signs his name to it as a guarantee that the collector has called on him and that the information is correct. The original returns are sent to the statistician without being compiled, and they are classified in the statistical office according to the municipal districts in which they are gathered. Manufacturing returns are collected at the same time, and by the same agency.

There is no popular prejudice in the colony against giving the information, and consequently the penalty clause is seldom enforced. Every farmer has a guarantee that his schedule will not be used to his injury or discredit, for the collector is under a penalty not to divulge any information it contains, and the returns are only published in the aggregate by municipal districts.

As for the municipal bodies, they are subsidised by the Government, and if they hesitate or refuse to collect the statistics the Government has power to stop their subsidy.

It has also power, if any local body does not send in the returns by the proper time, to appoint a collector to gather them and charge the cost to the delinquent body.

The Legislature of Tasmania passed a measure for the collection of statistics in 1877, containing provisions similar to the Victoria Act, and conferring like powers on the Government statistician.

The history of agricultural statistics in the United States is so well known that it only needs a brief reference here. Up to 1861 the subject of agriculture as a branch of Government at Washington was connected with the Patent Office, and its chief work consisted in collecting seeds and cuttings and information on their culture, for which a small annual grant was made. The Department of Agriculture as it now exists was organized by an Act of Congress passed in 1862, and in it provision was made for the collection of statistics and crop reports. Besides the commissioner, the officers of the Department consist of a statistician, a chemist, an entomologist, a microscopist, a botanist and a superintendent of gardens and grounds. The statistician, in addition to his own special duties, is editor of the Department, and all papers intended for the Monthly and Annual Reports pass through his hands. The crop reports are collected from all sections of the Union by a staff of correspondents selected with an eye to their intelligence, experience and general fitness. The number has been steadily increased, and is now in excess of four thousand. It is estimated that the value of their service is \$150,000 a year, but their only remuneration is a copy of the publications of the Department. All communications and other matter pertaining to the business of the department, not exceeding in weight 32 oz., may be sent and received through the mails free of charge.

The Annual Report is so highly prized that 300,000 copies of it are now published for distribution by the authority of Congress. In Great Britain both the Annual and the Monthly Reports are so much valued that the Minister at Washington was last year requested to secure copies, as soon as possible after publication, for the use of members of Parliament and for the Central Chamber of Agriculture.

In many of the States, but especially throughout the West, agricultural and industrial statistics are collected annually through the agency of municipal assessors, to be compiled and published by the State Boards of Agriculture. In some States these returns are elaborate, and are found to be very serviceable in promoting settlement.

The State of New York in 1862 sought to utilize the local agricultural and horticultural societies in collecting statistics. The Act provided that every county or town society receiving an annual appropriation of money or books should appoint a suitable person for each school district to gather statistics of the agricultural and horticultural products and the improvements of each year, and report the same to the president of the society, who in his turn would prepare a statement showing the results in each town by school districts, and forward it to the Secretary of the State Society. The societies who should faithfully perform the duties required of them were entitled to receive the amount of their annual appropriation without providing a like sum, and the district collectors were entitled to one copy each of the Transactions of the American Institute and of the State Agricultural Society for the year for which the statistics were collected. The system began well, but the lack of promptness in issuing the reports destroyed it. The Transactions of 1862 were not printed until late in 1864, and the collectors despairing of the promised reward abandoned their work in disgust.

The first attempt by a State to collect crop and live stock reports was made in Illinois, in 1876. The plan, which was matured and executed by the secretary of the State Board of Agriculture, has been found to work well and is popular with the farmers. The first step was to select a staff of reliable correspondents throughout the State—about five for each county—and entrust them with the task of furnishing information. To those correspondents blanks and letters of instruction are sent out from time to time, and reports are compiled from their answers for monthly publication during the growing season. The assessors, who go their rounds during May, are now required to take the acreage of the growing crops, and complete statistics of the previous year. With these data, and the returns of the correspondents, the secretary is supplied with ample material for preparing his monthly reports, which are promptly published in pamphlet form and through the State press.

The same plan has since been adopted in Iowa, Ohio and Michigan, but in the latter State the work is carried on under the direction of the Secretary of State. In Ohio the crop estimates are verified by returns from threshers, when the threshing season begins, and in this way great accuracy is attained. The only compensation to the correspondents in these States is a copy each of the Monthly and Annual Reports.

It is now proposed to harmonize the work of the State and National departments, and a conference will be held at Washington during the present month to effect that object.

THEIR SCOPE AND SYSTEM.

In maturing a scheme of statistics for Ontario, we should aim to adapt it to the characteristics of our agriculture and to our institutions. We should have in view the kind of information the country needs, the most economical means of collecting it consistent with promptness and accuracy, and an intelligent method in preparing the returns.

It is important that we should know :

1. The area of land in occupation—cleared, in woods, and marshy, or waste ;
2. The acreage under the principal grain and root crops and grasses, and in pasture ;
3. The acreage under orchard and garden, and the produce of fruit ;
4. The condition and promise of the growing crops, and their produce when harvested ;
5. The number of live stock by classes, and the wool and dairy products ;
6. The capital invested in real estate, live stock and farming implements ;
7. The average market prices of farm produce, and the wages of farm and domestic labour ; and
8. The state of the weather.

It would also be desirable to collect information respecting the nature of the soil, the methods of cultivation and systems of cropping, the extent and cost of underdraining, the use of fertilizers, the progress of improvement in live stock (which might be shown by a census of the leading breeds), the number of animals fattening for market, the extent of injury to crops and live stock by blight or disease, the rent value of land, and the topography of the country. But in making up the schedule it is better to err on the side of caution ; there is a danger of accomplishing but little through attempting too much.

The statistical tables from year to year should be constructed on the same plan, classified in the same order, and strictly limited to the kind and number of facts which have been ascertained to be sufficient. Frequent changes make comparison difficult.

For the same reason there should be permanency in the territorial divisions. But this cannot be obtained if electoral districts are chosen, these being subject to re-arrangement at every decennial distribution of seats.

The municipal divisions are less subject to disturbance, and returns by townships and counties arranged in their topographical order would, I think, prove to be more satisfactory and convenient than any other, for all the purposes for which statistics are required.

The machinery for collecting statistics is a more difficult subject to deal with, and the kind adopted must in a measure depend on the information we want. If it is to be mainly a return of the previous year's products, as in many States of the American Union, it can be gathered by the assessors. But if it is to be a return for the current harvest year, as in Great Britain and Ireland, it will be necessary to resort to other agencies.

Some useful statistics are now gathered by the assessors, and the schedule might be extended ; but unless the assessment work was done at a later period of the year, as in Ohio and Illinois, we cannot look to the returns of those officers for much of the data required. Besides, owing to the relationship of assessment and taxation, the collection of statistics by assessors might arouse prejudice against the system and result in false returns being made. It is a fact that the number of live stock in the Province in 1878, as given by the municipal returns, is 1,440,000 less than in 1871, as given by the census.

The Electoral District and Township Agricultural Societies, the Horticultural Societies, and the Dairymen, Fruit-growers and Entomological Societies could be relied on to contribute valuable service, for, besides being liberally subsidised by the Government, it is

directly in the line of their functions to aid any measure intended to advance the agricultural welfare of the country.

The Electoral District Societies cover the whole field, and they might undertake the direction of local work.

The Township Societies, with a more limited area for their oversight, would doubtless prove to be a more thorough organization ; but while there are only 282 societies in the Province, there are 493 townships.

The Horticultural Societies number 32, and are all located in the towns.

Special work in their respective lines could be entrusted to the other societies named, as well as to the Agricultural and Arts Association and to the Veterinary Inspectors.

Then we have the School Section—the smallest territorial district in the Province governed by a body possessing administrative functions. The school sections are co-extensive with settlement, and, like the agricultural and other societies, they receive large annual subsidies from the Government.

With the help of these several organizations—the township councils, the several agricultural and allied societies, and the school boards—we should be able to establish a model system for the collection of agricultural returns, and under which it should be possible to attain to ideal accuracy and promptness in the publication of crop reports.

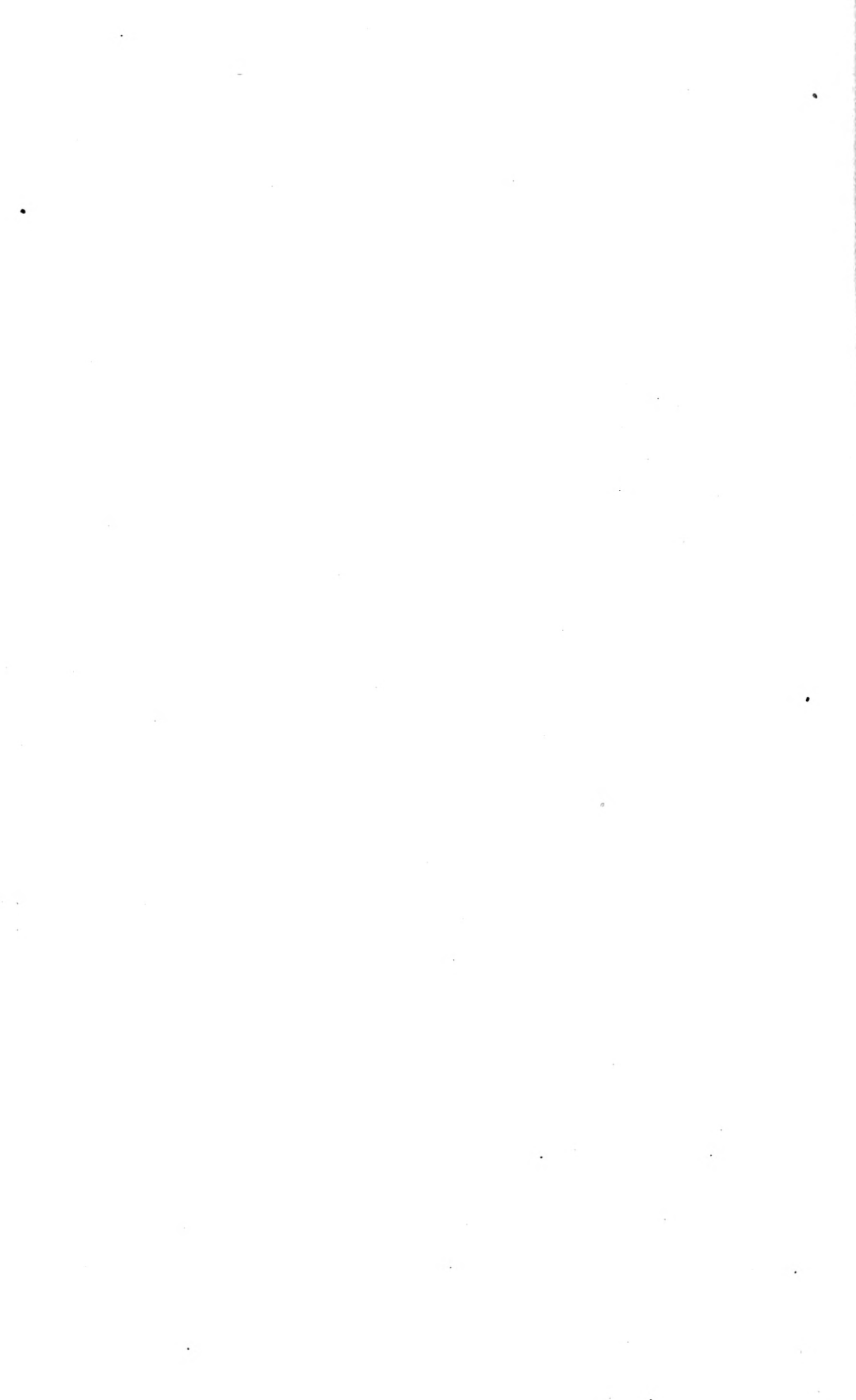
I have already remarked on the importance of uniformity and method in the tables. It only remains to add, that their contents should be clearly indicated ; that needless details only tend to give untrustworthy results ; that the object of every return—whether it be to give information of immediate value or interest to the public, or to be available as permanent statistical information—should be distinctly kept in view ; and that the business of the official statistician is to supply the dry facts, without any admixture of theories or opinions.

With the hearty co-operation of the farmers of the Province, which will be indispensable under any system, I have a strong conviction that the Statistical Bureau can do efficient and serviceable work ; and I trust in good time to see its sphere extended so as to embrace all the great industries of the country.

Respectfully submitted.

ARCHIBALD BLUE.

OFFICE OF THE COMMISSIONER OF AGRICULTURE,
TORONTO, 10th January, 1882.



APPENDIX TO REPORT

OF THE

Commissioner of Agriculture and Arts.

APPENDIX (H).

AMOUNT EXPENDED FOR THE ENCOURAGEMENT OF AGRICULTURE IN ONTARIO IN 1881.

No. 1.—Amounts paid to Agricultural Societies in 1881.

NAME OF SOCIETY.	Grant.	NAME OF SOCIETY.	Grant.
	\$ c.		\$ c.
Addington.....	700 00	<i>Brought forward</i>	19,581 00
Algoma	700 00	Hastings, West.....	700 00
Brant, North	700 00	Huron, East	700 00
Brant, South	700 00	Huron, West	700 00
Bruce, North	700 00	Huron, South	700 00
Bruce, South	700 00	Kent, East	700 00
Brockville, E. D.....	700 00	Kent, West	700 00
Carleton	700 00	Lambton, East	700 00
Cardwell	700 00	Lambton, West.....	700 00
Cornwall, E. D.	350 00	Lanark, North	700 00
Dufferin	700 00	Lanark, South	700 00
Dundas	700 00	Lennox	700 00
Durham, East.....	700 00	Leeds, South	700 00
Durham, West.....	700 00	Leeds, N., and Grenville, N.	700 00
Elgin, East	700 00	Lincoln	700 00
Elgin, West	700 00	London, E. D.	350 00
Essex, North	700 00	Middlesex, North.....	700 00
Essex, South	700 00	Middlesex, East	700 00
Frontenac	700 00	Middlesex, West	700 00
Grenville, South.....	700 00	Monck	700 00
Grey, North	700 00	Muskoka	700 00
Grey, South	700 00	Niagara, E. D.	350 00
Grey, East	700 00	Norfolk, North.....	700 00
Glengarry	700 00	Norfolk, South	700 00
Halton	700 00	Northumberland, East.....	700 00
Haldimand	700 00	Northumberland, West	700 00
Hamilton, E. D.	350 00	Ontario, North	700 00
Hastings, North.....	681 00	Ontario, South	700 00
Hastings, East	700 00	Ottawa, E. D.	350 00
		Oxford, North	700 00
<i>Carried forward</i>	19,581 00	<i>Carried forward</i>	38,831 00

No. 1.—Amounts paid to Agricultural Societies in 1881.—*Continued.*

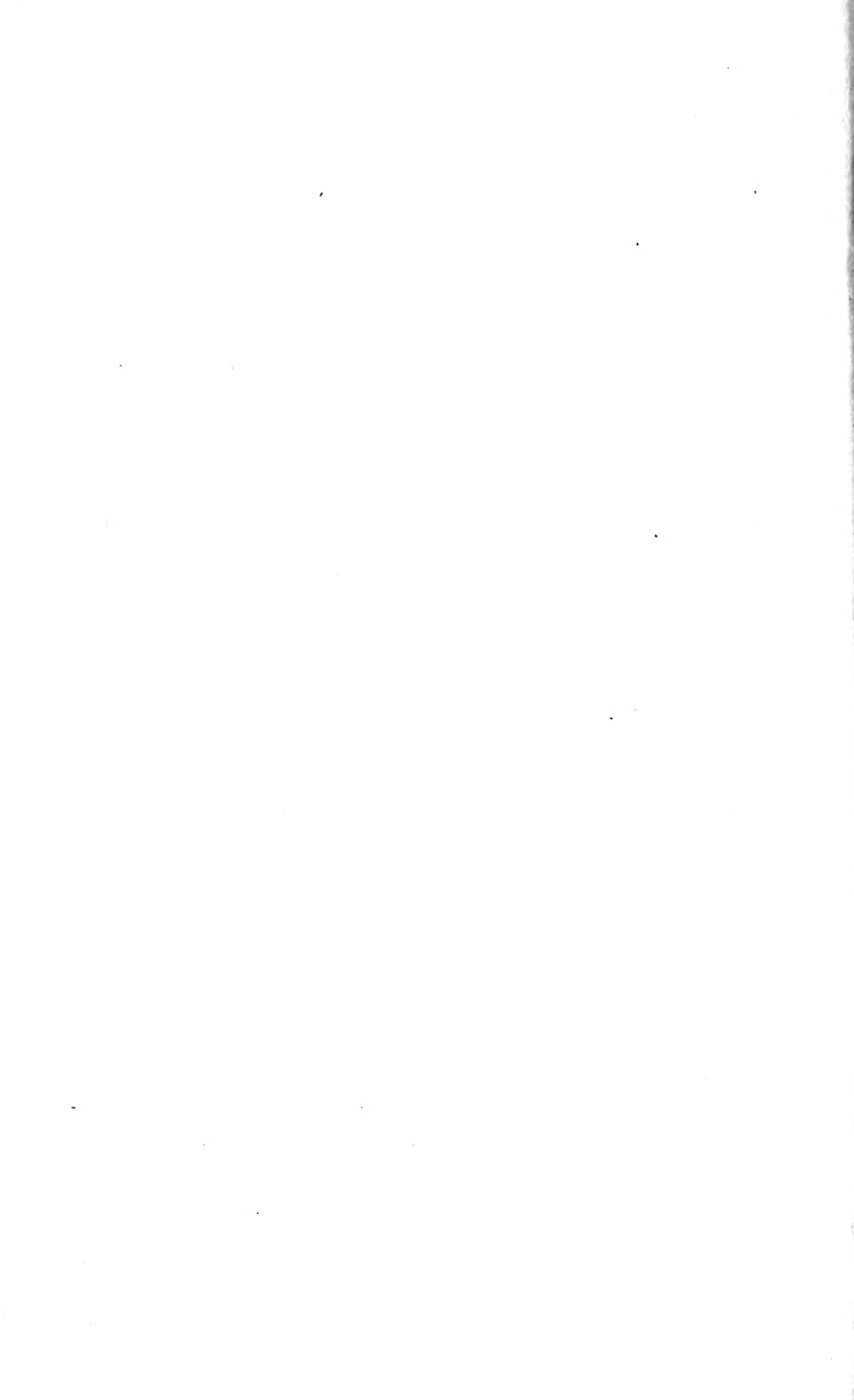
NAME OF SOCIETY.	Grant.	NAME OF SOCIETY.	Grant.
	\$ c.		\$ c.
<i>Brought forward</i>	38,831 00	<i>Brought forward</i>	49,331 00
Oxford, South	700 00	Toronto, E. D.	550 00
Peel	700 00	Victoria, North	700 00
Perth, North	700 00	Victoria, South	700 00
Perth, South	700 00	Waterloo, North	700 00
Peterboro', East	700 00	Waterloo, South	700 00
Peterboro', West	700 00	Welland	700 00
Prince Edward	700 00	Wellington, West	700 00
Prescott	700 00	Wellington, Centre	700 00
Renfrew, North	700 00	Wellington, South	700 00
Renfrew, South	700 00	Wentworth, North	700 00
Russell	700 00	Wentworth, South	700 00
Simcoe, East	700 00	York, North	700 00
Simcoe, West	700 00	York, East	700 00
Simcoe, South	700 00	York, West	700 00
Stormont	700 00		
<i>Carried forward</i>	49,331 00	<i>Total</i>	58,981 00

No. 2.—Payments for the encouragement of Agriculture in 1881.

SERVICE.	Appropriation.	Expended in 1881.	Unexpended or Over-expended.
	\$ c.	\$ c.	\$ c.
Electoral District Agricultural Societies	59,800 00	58,981 00	*\$19 00
Outlying Districts—Haliburton, \$150; Minden, for \$1880, \$150; do for 1881, \$150	450 00	450 00	
Agricultural and Arts Association	10,000 00	10,000 00	
Western Dairymen's Association	1,500 00	1,500 00	
Eastern do	1,500 00	1,500 00	
Ontario Poultry Association	700 00	700 00	
Ontario Fruit Growers' Association	1,800 00	1,800 00	
Ontario Entomological Society	1,000 00	1,000 00	
<i>Sundries:—</i>			
John Notman, stationery	\$855 10		
C. B. Robinson, printing	677 98		
W. Warwick & Son, binding	609 55		
Burland Lithographic Company, lithography	105 70		
Willing & Williamson, prize books	20 00		
A. Smith, veterinary services	35 10		
W. A. Dunbar, do	12 00		
Six Nations Indian Society	50 00		
<i>Total</i>	78,750 00	78,296 43	+365 43

* Unexpended.

+ Over-expended.



BINDING SECT. AUG 23 1967

